SIEMENS

Iso C 3D

[redacted] SP

DICOM Conformance Statement

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1 Introduction

Iso C 3D is an Imaging System for Fluoroscopic and Radiographic use.

1.1 Purpose of the document

This Iso C 3D Conformance Statement is written according to part PS 3.2 of [1] see 1.4 .

The applications described in this conformance statement are the Iso C 3D product using software VB00B. The Iso C 3D DICOM network implementation acts as SCU and SCP for the DICOM Query/Retrieve service, storage Service, as SCU for the defined storage service IODs and as SCU for the DICOM Print and Modality Worklist service. The application is based on the Syngo Version VB10H.

There are some restrictions because of the fact, that Iso C 3D consist of a 2 D and a 3 D component. Both components handle their own database. The description in this Conformance ‘Statement means always the database of the 3D component.

For details of the restrictions see,

1.2Area of validity of the document

This DICOM Conformance Statement refers to the Iso C 3D product using software VB00B.

1.2 Scope

This DICOM Conformance Statement refers to Iso C 3D product using software VB00B. The following table relates software names to the Iso C 3D product. The Softwareversion which is coded in the SoftwareName is valid till any Code concerning the Dicom Interface is changed.

Table 1: Siemens Iso C 3D DICOM Products

Software Name	Siemens Product
Iso C 3D_VB00B	Iso C 3D

1.3 Definitions and Abbreviations

1.3.1 Definitions

DICOM	Digital Imaging and Communications in Medicine
DIMSE	DICOM Message Service Element
DIMSE-C	DICOM Message Service Element with Composite information objects
DIMSE-N	DICOMMessageService Element with Normalized information objects.

1.3.2 Abbreviation

ACR	American College of Radiology
AE	DICOM Application Entity
ASCII	American Standard Code for Information Interchange
FSC	File Set Creator
FSR	File Set Reader
FSU	File Set Updater
HIS	Hospital Information System
IOD	DICOM Information Object Definition
ISO	International Standard Organization
NEMA	National Electrical Manufacturers Association
O	Optional Key Attribute
R	Required Key Attribute
RIS	Radiology Information System
PDU	DICOM Protocol Data Unit
SCU	DICOM Service Class User (DICOM client)
SCP	DICOM Service Class Provider (DICOM server)
SOP	DICOM Service-Object Pair
U	Unique Key Attribute

1.4 References

[1] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.1-9

1.5 Connectivity and Interoperability

The implementation of the Iso C 3D DICOM interface has been carefully tested to assure

compliance with this Conformance Statement. But the Conformance Statement and the DICOM standard does not guarantee interoperability of Siemens modalities and modalities of other vendors.

The user must compare the relevant Conformance Statements and if a successful interconnection seems possible, the user is responsible to specify an appropriate test suite and to validate the required interoperability. A network environment may need additional functions outside of the scope of DICOM.

2 Implementation Models

2.1 Verification

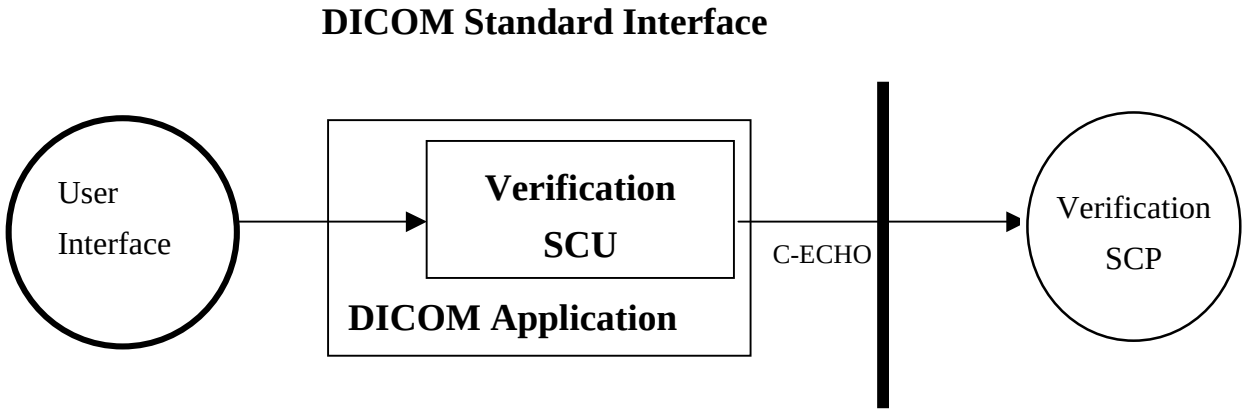
The Verification service class defines an application-level class of service which allows for the operator to verify the ability of an application on a remote node to respond to DICOM messages. The DICOM Service Tool application supports the Verification service to act as SCU.

The other direction - responding to Verification requests from remote applications - is handled by the Storage SCP application.

2.1.1 Application Data Flow Diagram

The Iso C 3D DICOM network implementation is a Windows NT application and acts as SCU for the Verification service.

Figure 1: Application Data Flow Diagram Verification SCU



2.1.2 Functional Definitions of Application Entities

The DICOM Service Tool application opens an association to an application on the remote node and sends a Verification message to verify that the remote application can respond to DICOM messages.

2.1.3 Sequencing of real World Activities

not applicable.

2.2 Storage

The Iso C 3D DICOM Application Entity originates associations for Storage of DICOM Composite Information Objects in Remote Application Entities.

2.2.1 Application Data Flow Diagram

The Iso C 3D DICOM network implementation is a Windows NT application and acts as SCU and SCP for the C-STORE DICOM network service and as SCP for the C-ECHO DICOM net-work service

Figure 2: Application Data Flow Diagram C-STORE SCU

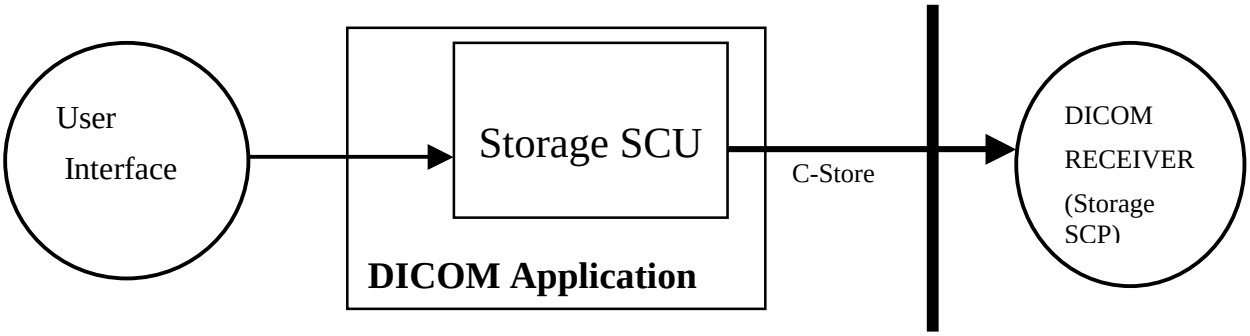
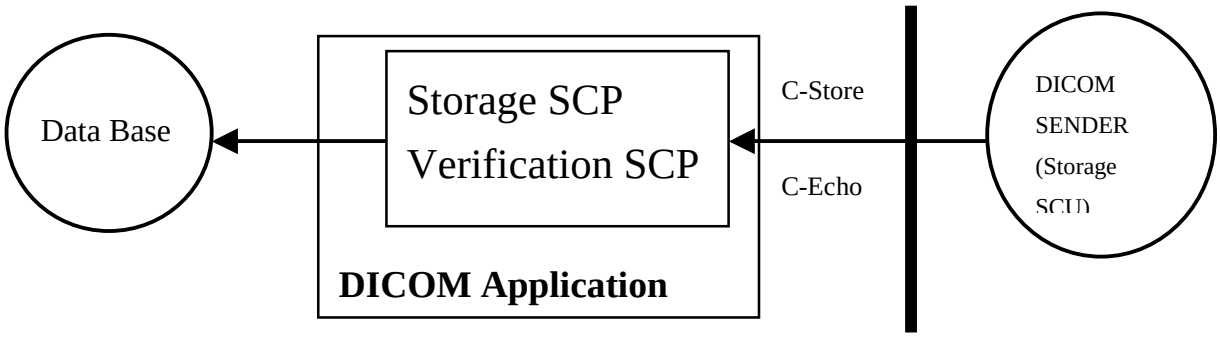


Figure 3: Application Data Flow Diagram C-STORE SCP



2.2.2 Functional Definitions of Application Entities

All SCP components of the Iso C 3D DICOM application are operating as background daemon processes. They are automatically started at system startup.

2.2.3 Sequencing of real World Activities

not applicable.

2.3 Storage Commitment Push Model

The Storage Commitment service class defines an application-level class of service which facilitates the commitment to storage. It performs an additional task of commitment of composite objects apart from the network based storage of images as defined by the Storage Service class.

2.3.1 Application Data Flow Diagram

Figure 4: Application Data Flow Diagram Storage Commitment SCU

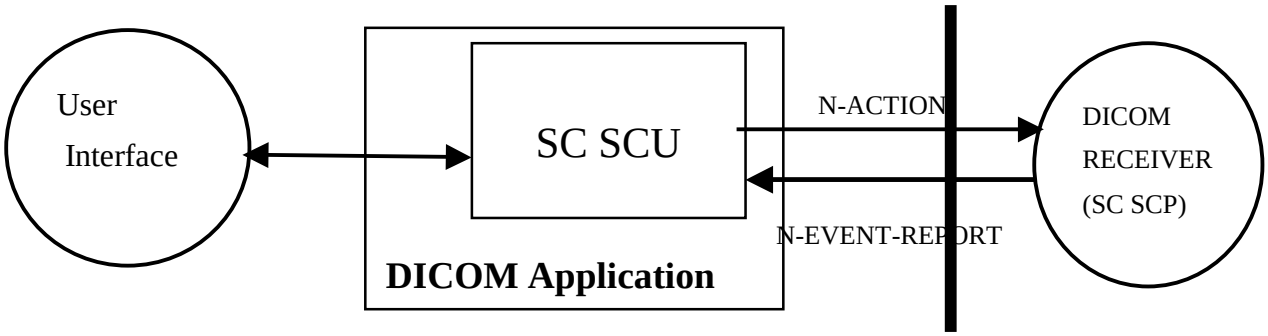
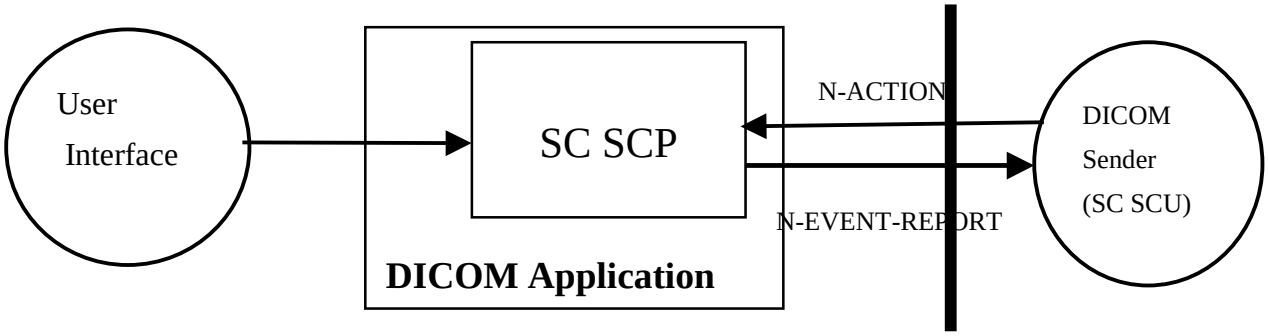


Figure 5: Application Data Flow Diagram Storage Commitment SCP



2.3.2 Functional Definitions of Application Entities

The Storage Commitment Push Model SCU (SC-SCU) uses the Storage Commitment Service Class to get commitment for one or more composite objects from the Storage Commitment Push Model SCP (SC-SCP). SC-SCU issues an N-ACTION to SC-SCP containing a list of references to composite objects, requesting that the SC-SCP takes responsibility for storage commitment of the composite objects. If the SC-SCP has determined that all the composite objects exist and it has successfully completed storage commitment for the set of composite objects, it issues an N-EVENT-REPORT with status successful and the list of stored images. SC-SCU now knows that the composite objects have been committed by SC-SCP and can delete its copies of com-posite objects. The information from the N_EVENT-REPORT is propagated back to the user interface.

If committed storage cannot be done for some reason for any of the list of composite objects the SC_SCP issues an N-EVENT-REPORT with a status of completed-failures exist and would in-clude both the successful and failed list. The syngo SCU can be configured to receive the N_EVENT_REPORT on the same association on which N_ACTION was sent or on a different association. The syngo SCP will send the N_EVENT_REPORT on the same association on which the N_ACTION was received if this association is still open. Otherwise, the N_EVENT_REPORT will be sent on a new association. It is configurable if syngo is running on an archive system. If not, then syngo SC SCP will verify if the composite objects are stored in the local database and answer accordingly. Otherwise There the archive system is asked to confirm the commitment, and the answer returned by the archive will be returned to the SC SCU.

2.3.3 Sequencing of real World Activities

not applicable.

2.4 Query/Retrieve

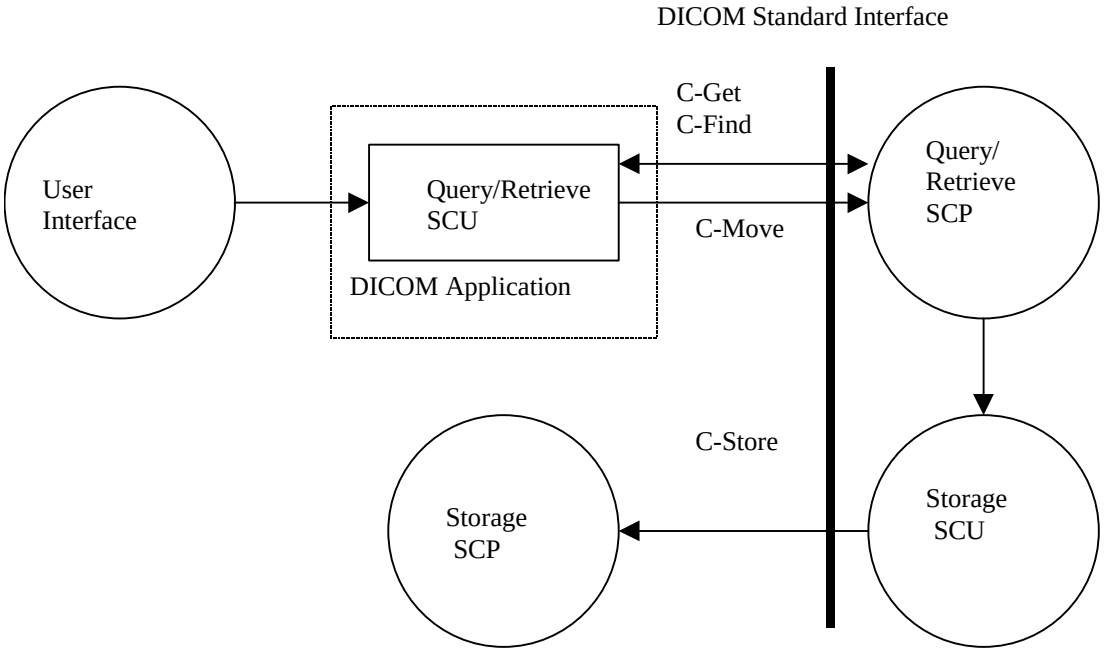
The query/retrieve service class defines an application-level class of services which facilitates the management of images and patient data against the well defined information model of DICOM and allows a DICOM AE to retrieve images from a remote DICOM node or to

request a remote DICOM AE to initiate a transfer of images to another DICOM AE. The DICOM query/retrieve application supports the query/retrieve services to act as SCU and SCP.

2.4.1 Application Data Flow Diagram

The Iso C 3D DICOM network implementation is a Windows NT application and acts as SCU and SCP for the query/retrieve network service.

Figure 6: Application Data Flow Diagram QUERY/RETRIEVE SCU



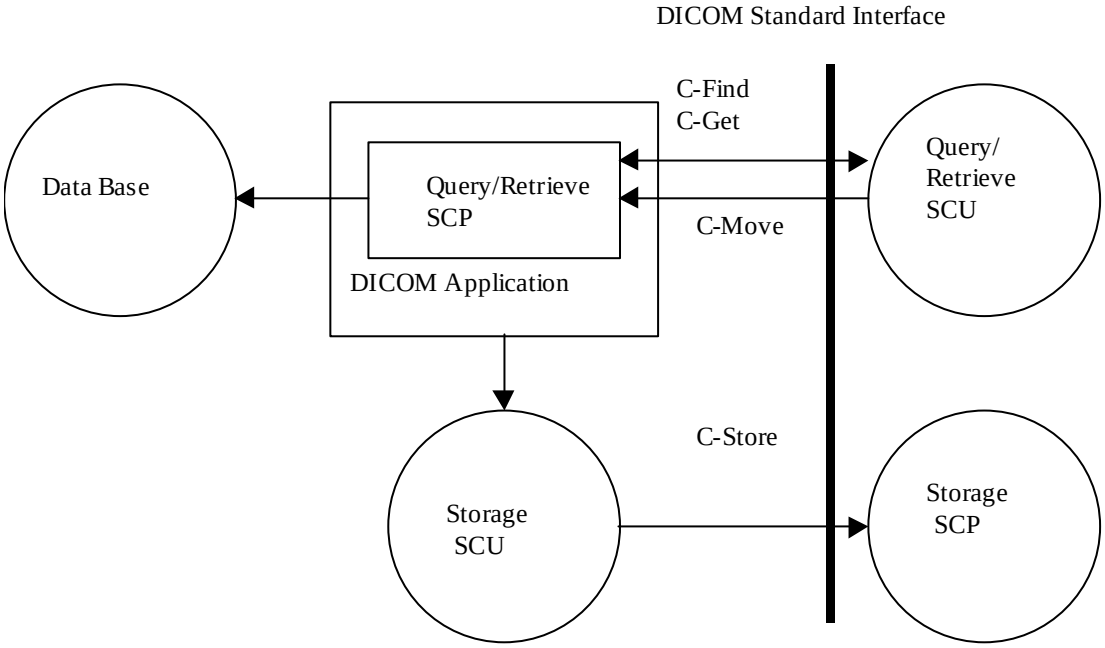


Figure 7: Application Data Flow Diagram QUERY/RETRIEVE SCP

2.4.2 Functional Definitions of Application Entities

The query/retrieve SCU requests the query/retrieve SCP to perform a match to the keys specified in the request and a C-GET or a C-MOVE DIMSE service initiates a C-STORE sub operation to transfer an image from a Storage SCU to a Storage SCP.

The query/retrieve SCP responds to C-FIND DIMSE services and a C-GET or a C-MOVE involves the Iso C 3D DICOM query/retrieve SCP application to initiate a C-STORE sub operation to a Storage SCP.

All components of the Iso C 3D DICOM query/retrieve SCP application are operating as back-ground daemon processes. They are automatically started at system startup.

2.4.3 Sequencing of real World Activities

not applicable.

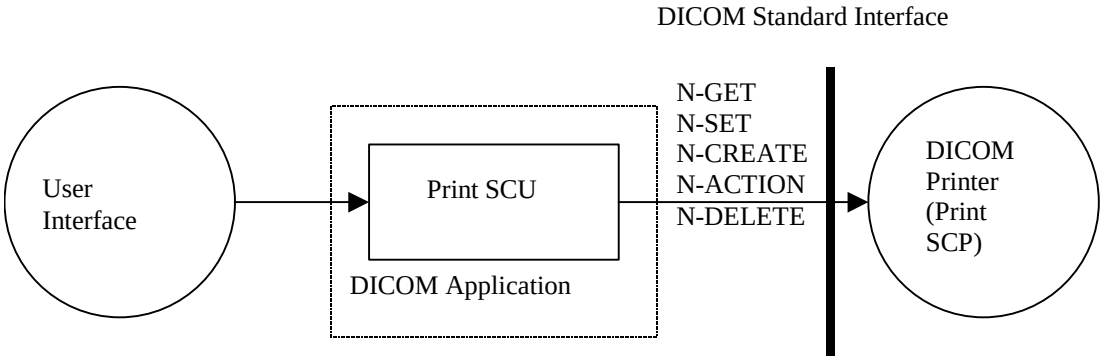
2.5 Print

The Print Management Service Classes define an application-level class of services which facilitate the printing of images on a hardcopy medium. The print management SCU and print management SCP are peer DICOM print management application entities. The DICOM print application supports the print management DIMSE services to act as SCU.

2.5.1 Application Data Flow Diagram

The Iso C 3D DICOM network implementation is a Windows NT application and acts as SCU for the print management network service.

Figure 8: Application Data Flow Diagram PRINT SCU



2.5.2 Functional Definitions of Application Entities

The user invokes a print job and the SCU uses the SOP classes of a film session, a film box and image boxes for acquiring all the information which is required for a film session. The N-ACTION is used to print the film session. The DIMSE services of the Printer SOP Class and the Print Job SOP Class allow the SCU to control the print jobs and printer status information of the SCP.

2.5.3 Sequencing of real World Activities

not applicable.

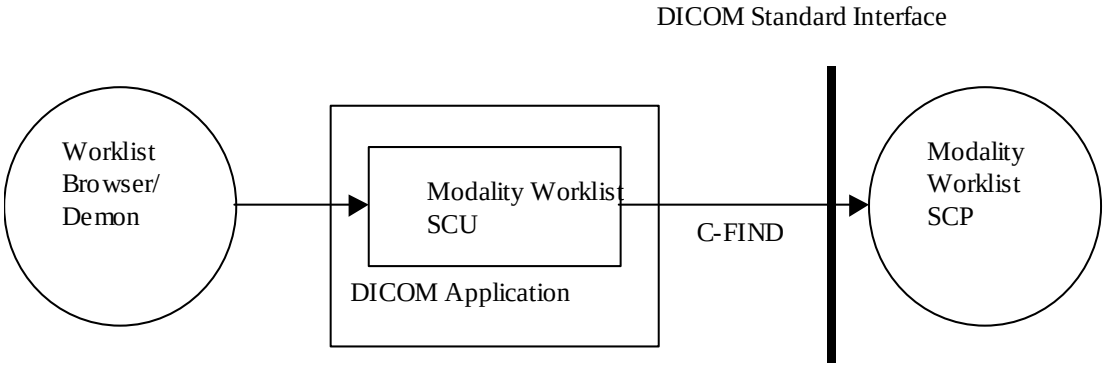
2.6 Modality Worklist

The modality worklist service class defines an application-level class of service which facilitates the transfer of worklists from the information system to the imaging modality. The worklist is queried by the AE and supplies the SCU with the scheduled tasks which have to be performed on the modality. The DICOM worklist application supports the worklist service to act as SCU.

2.6.1 Application Data Flow Diagram

The Iso C 3D DICOM network implementation is a Windows NT application and acts as SCU for the worklist network service.

Figure 9: Application Data Flow Diagram MODALITY WORKLIST SCU



Note: It is configurable to get the worklist updates either automatically (in a configurable time iinterval) or manually (initiated by the user). There are two kinds of query the user can do: broad worlist query (all jobs for the own modality or own application entity) and patient based worklist query (where more search keys can be given, including Patient Name and Patient ID).

2.6.2 Functional Definitions of Application Entities

The modality worklist SCU requests the worklist SCP to perform a match to the keys specified in the C-FIND DIMSE service.

The modality worklist SCP responses to the C-FIND query and sends scheduled imaging service requests and patient demographic information from the information system to the modality.

2.6.3 Sequencing of real World Activities

not applicable.

3 AE Specifications

3.1 Verification AE Specification

3.1.1 Association Initiation by Real-World Activity

The Iso C 3D Service Tool application attempts to initiate a new association for

•DIMSE C-ECHO

service operations.

3.1.1.1 **Real-World Activity - Verification SCU**

3.1.1.1.1 Associated Real-World Activity - Verification SCU

The associated Real-World activity is a C-ECHO request initiated by the DICOM Service Tool application. If the process successfully establishes an association to a remote Application Entity, it will send the C-ECHO-Request via the open association to verify that the remote Application Entity is responding to DICOM messages.

3.1.1.1.2 Proposed Presentation Contexts - Verification SCU

The Iso C 3D application will propose Presentation Contexts as shown in the following table:

Table 2: Initiation presentation context Verification

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotia-tion
Verification	1.2.840.10008.1.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	1.2.840.10008.1.2. 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

3.1.1.1.3 SOP Specific Conformance Statement - Verification SCU

The Application conforms to the definition of a Verification SCU in accordance to the DICOM Standard.

3.1.2 Association Acceptance Policy

The Verification SCP is part of the Storage SCP - see section 3.2.2

3.2 Storage AE Specification

Iso C 3D provides Standard Conformance to the following DICOM V3.0 SOP Classes as both an SCU. and SCP:

Table 3: Standard SOP Classes as an Storage SCU and an SCP

SOP Class Name	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
XA (X-Ray Angiographic) Image Storage	1.2.840.10008.5.1.4.1.1.12.1

as SCP

SOP Class Name	SOP Class UID
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
US Image Storage	1.2.840.10008.5.1.4.1.1.6.1
SC (Secondary Capture) Image Storage	1.2.840.10008.5.1.4.1.1.7
XA (X-Ray Angiographic) Image Storage	1.2.840.10008.5.1.4.1.1.12.1
XA Bi-Plane (X-Ray Angiographic Bi-Plane) Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3
XRF (X-Ray Radiofluoroscopic) Image Storage	1.2.840.10008.5.1.4.1.1.12.2
NM Image Storage	1.2.840.10008.5.1.4.1.1.20

3.2.1 Association Establishment Policies

3.2.1.1 General

The configuration of the Iso C 3D DICOM application defines the Application Entity Titles, the port numbers and of course the host name and net address.

3.2.1.2 Number of Associations

The Iso C 3D DICOM application initiates several associations at a time, one for each transfer request being processed.

3.2.1.3 Asynchronous Nature

The Iso C 3D DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

3.2.1.4 Implementation Identifying Information

The Implementation Class UID Iso C 3D DICOM software provides a single of

1.3.12.2.1107.5.12.6"

and an Implementation Version Name of

• “VB10H_VB00B”.

3.2.1.5 Maximum PDU Size offered

- The maximum PDU size offered by Iso C 3D is configurable with default set to 28672 Bytes

3.2.1.6 Dicom Application Context

Dicom Application context name: **1.2.840.10008.3.1.1.1**

Association Initiation by Real-World Activity

The Iso C 3D DICOM application attempts to initiate a new association for

• DIMSE C-STORE service operations.

3.2.1.7 Real-World Activity - Storage SCU

3.2.1.7.1 Associated Real-World Activity - Storage SCU

The associated Real-World activities are:

- a user wants to send one or more composite objects to a remote node.
- The local C-MOVE SCP initiates C-STORE suboperations as a reaction to a C-MOVE-RQ comming from a remote node.

For both cases, if the process successfully establishes an association to a remote Application Entity, it will transfer each image one after another via the open association. If the C-STORE Response from the remote Application contains an error status the association is aborted or released.

3.2.1.7.2 Proposed Presentation Contexts - Storage SCU

The Iso C 3D DICOM application will propose Presentation Contexts as shown in the following table. Not all the listed transfer syntaxes will be proposed, please see the discussion after the table for the actual proposed transfer syntaxes.

Table 4: Initiation presentation context Storage

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
CT Image Storage SOP class	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None
XA Image Storage SOP class	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCU	None

Note:

Not all the listed transfer syntaxes will be proposed all the time. For some abstract syntaxes only a list of uncompressed (UC) transfer syntaxes (one or more) will be proposed, for other abstract syntaxes also JPEG Lossless (LL) syntax will be proposed and/or a list of JPEG Lossy (LY) transfer syntaxes. The contents of this lists is configurable, e.g. UC could be configured to contain only Implicit Little Endian for instance.

Depending on the real world activity initiating the C-STORE, we have the following behaviours:

- • if the C-STORE is initiated by a user, a configuration parameter called QualityFactor(Q) will be used to decide which transfer syntax lists will be proposed. Q can take values between 0 and 100. If Q=0, only UC will be proposed. If Q = 100, UC and LL will be proposed. Else UN and LY will be proposed.
- • if the C-STORE is initiated by the C-MOVE SCP, there is another configuration parameter called Compression Types Supported (CTS) which will be used to decide what transfer syntaxes are proposed. CTS can take values between 0 and 2. If CTS=0, only UC will be pro-posed. If CTS=1, UC and LY will be proposed. Else UC and LL will be proposed.

It is not possible to send an image that is locally stored in a Lossy compressed format using an uncompressed or lossless transfer syntax.

3.2.1.7.3 SOP Specific Conformance Statement - Storage SCU

The DICOM images created by Iso C 3D DICOM application conform to the DICOM IOD definitions (Standard extended IODs). But they will contain additional private elements which have to be discarded by a DICOM system when modifying the image.

When performing a save for a new operation, all non defined syngo attributes will be deleted. For association and DIMSE level time outs refer sec. 6.2

3.2.1.7.3.1 Image Pixel Attribute Description for Grayscale Images

The Iso C 3D DICOM application supports the MONOCHROME2 and MONOCHROME1(not supported for XA and XRF) photometric interpretation pixel format and graphic overlay with unsigned integer and 8 or 16 bits allocated. Possible values:

Pixel plane

samples per pixel (attribute 0028, 0002) = 1

photometric interpretation (attribute 0028,0004) = "MONOCHROME1"

- photometric interpretation (attribute 0028,0004) = "MONOCHROME2"
- pixel representation (attribute 0028, 0103) = 0
- bits allocated (attribute 0028, 0100) = 8, 16
- bits stored (attribute 0028,0101) = 8, 10, 12
- high bit (attribute 0028,0102) = 7, 9, 11

Overlay plane

- overlay type (attribute 60xx, 0040) = "G"
- overlay bits allocated (attribute 60xx, 0100) = 16
- overlay bit position (attribute 60xx, 0102) = 12, 13, 14, 15

Overlay plane

- overlay type (attribute 60xx, 0040) = "G"
- overlay bits allocated (attribute 60xx, 0100) = 1
- overlay bit position (attribute 60xx, 0102) = 0
- overlay data (attribute 60xx, 3000) = supported.

The Iso C 3D DICOM application sends also the MONOCHROME1 and MONOCHROME2(not supported for XA and XRF) photometric interpretation pixel format with binary 2's complement integer and 16 bits allocated.

Possible values:

Pixel plane

- samples per pixel (attribute 0028, 0002) = 1
- photometric interpretation (attribute 0028,0004) = "MONOCHROME1"
- photometric interpretation (attribute 0028,0004) = "MONOCHROME2"
- pixel representation (attribute 0028, 0103) = 1
- bits allocated (attribute 0028, 0100) = 16
- bits stored (attribute 0028,0101) = 16
- high bit (attribute 0028,0102) = 15

Overlay plane

- overlay type (attribute 60xx, 0040) = "G"
- overlay bits allocated (attribute 60xx, 0100) = 1
- overlay bit position (attribute 60xx, 0102) = 0
- overlay data (attribute 60xx, 3000) = supported.

3.2.2 Association Acceptance Policy

The Iso C 3D DICOM application attempts to accept a new association for

• DIMSE C-ECHO

• DIMSE C-STORE

service operations.

3.2.2.1 Real-World Activity - Storage SCP

3.2.2.1.1 Associated Real-World Activity - Storage SCP

The daemon receiving process will accept an association and will receive images(see below) transmitted on that association and will store the images on disk in the own data base.

3.2.2.1.2 Proposed Presentation Contexts - Storage SCP

The Iso C 3D DICOM application will propose Presentation Contexts as shown in the following table:

Table 5: Acceptable presentation Contexts Storage

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotia-tion
CR Image. Service class Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	12.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
CT Image Storage Service class	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
MR Image Service class Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
NM Image. Storage Service class	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None

SC Image Storage Service class	1.2.840.10008.5.1. 4.1.1.7	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
XA Image Storage Service class	1.2.840.10008.5.14.1.1.12.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4)JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
XA Bi-Plane Service class Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.12.3.	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
XRF Image Service class Storage	1.2.840.10008.5.1. 4.1.1.12.2	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
US MF Image Service class Storage	1.2.840.10008.5.1. 4.1.1.3.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None
US Image Service class Storage	1.2.840.10008.5.1. 4.1.1.6.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian JPEG Baseline JPEG Extended (2 & 4) JPEG Lossless Non-hierarchical	1.2.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51 1.2.840.10008.1.2.4.70	SCP	None

3.2.2.1.3 SOP Specific Conformance Statement – Storage SCP

The Iso C 3D DICOM application conforms to the Full Storage Service Class at Level 2 – with the exception that private Sequences (private elements with VR=SQ) are not supported in Explicit VR Transfer syntax and will be ignored. When private Sequences are received in

implicit VR then the whole sequence is stored as one binary element of VR=OW.

In the event of a successful C-STORE operation, the image has successful been written on disk in the Siemens CSA image format.

The Iso C 3D DICOM receiver returns the status Success upon successful operation otherwise one of the following status codes is returned and the association aborted:

• Refused (A700):

This error status indicates a lack of Resources (e.g. not enough disk space) on the Iso C 3D modality.

• Error (A900 or C000):

An error occurred while processing the image which makes it impossible to proceed. The image will not be stored and the association aborted.

If an image with the same SOP Instance UID (as that image being received) is already present in the database then the received image will be ignored. So if a remote node sends twice the same image (same SOP Instance UID) then there will still be only one image (the first) in the database of the DICOM receiver.

3.2.2.1.3.1 Image Pixel Attribute Acceptance Criterion for Grayscale Images

The Iso C 3D DICOM application accepts the MONOCHROME1 and MONOCHROME2(not for XA and XRF) photometric interpretation pixel format and graphic overlay with unsigned integer and 8 or 16 bits allocated. Accepted values:

Pixel plane

• samples per pixel (attribute 0028, 0002) = 1

• photometric interpretation (attribute 0028,0004) = “MONOCHROME1”

• photometric interpretation (attribute 0028,0004) = “MONOCHROME2”
MONOCHROME2(not for XA and XRF)

• pixel representation (attribute 0028, 0103) = 0 (unsigned)

• bits allocated (attribute 0028, 0100) = 8, 16

• bits stored (attribute 0028,0101) = 8, 10, 12(in case of 16 bits allocated 8 bits stored is not allowed)

• high bit (attribute 0028,0102) = bits stored –1

• only aspect ratio 1:1 is allowed

Overlay plane

• overlay type (attribute 60xx, 0040) = “G”

• overlay bits allocated (attribute 60xx, 0100) = 16

• overlay bit position (attribute 60xx, 0102) = 12, 13, 14, 15(only bits above high bit are allowed)

• overlay data (attribute 60xx, 3000) = supported.

For MOD LUT both the linear LUT (Rescale Slope/Intercept) and the MOD LUT SQ are supported and considered when pixel data is displayed. However the following limitations apply:

- The MOD LUT SQ will be ingnored for 8 bit signed pixels
- the pixel format is not changed by applying the MOD LUT SQ, even if the output range of the LUT is larger than the input range.(e.g. 8 bit -> 16 bit)
- If the MOD LUT SQ contains multiple LUTs then only the first one is used.

For VOI LUT also both the linear LUT (Window Center/Width) and the VOI LUT SQ are supported (VOI LUT SQ with 8 or 16 bit LUT data).

The Display application supports only rectangular Shutters in this version. Images with other shutter types will be displayed without Shutter.

3.2.2.1.4 Presentation Context Acceptance Criterion – Storage SCP

The Iso C 3D DICOM application will accept any number of verification or storage SOP classes that are listed above. In the event that the Iso C 3D DICOM application runs out of resources,it will reject the association request.

3.2.2.1.5 Transfer Syntax Selection Policies – Storage SCP

The Iso C 3D DICOM application supports

- the Implicit VR Little Endian, the Explicit VR Little Endian and Explicit VR Big Endian transfer syntaxes
- the JPEG Baseline and JPEG Extended transfer syntaxes (JPEG lossy).
- the JPEG Lossless Non-hierarchical transfer syntax.

Any proposed presentation context which includes one of these transfer syntaxes will be accepted Any proposed presentation context that does not include one of these transfer syntaxes will be rejected.

The order of preference in accepting a Transfer syntax is:

1. JPEG Extended Process 2 And 4.
2. JPEG Lossless Non-hierarchical
3. JPEG Baseline
4. Explicit VR Little Endian
5. Explicit VR Big Endian

6. Implicit VR Little Endian

3.3 Storage Commitment AE Specification

Table 6: Standard SOP Classes as Storage Commitment Push Model

SOP Class Name	SOP Class UID
Storage Commitment Push Model	1.2.840.10008.1.20.1

3.3.1 Association Establishment Policies

3.3.1.1 General

The configuration of Iso C 3D Storage Commitment AE defines the Application Entity Titles, the port numbers and of course the host name and net address.

3.3.1.2 Number of Associations

Iso C 3D Storage Commitment AE initiates several association at a time, one for each storage commitment request being processed.

3.3.1.3 Asynchronous Nature

Iso C 3D Storage Commitment AE does not support asynchronous communication (multipleout-standing transactions over a single association).

3.3.1.4 Implementation Identifying Information

Iso C 3D Storage Commitment AE provides a single Implementation Class UID of

1.3.12.2.1107.5.12.6"

and an Implementation Version Name of

• “VB10H_VB00B”.

3.3.2 Association Initiation Policy

Iso C 3D Storage Commitment AE initiates an association in two cases: when acting as SCU, in order to send a request for storage commitment and when acting as SCP and the association on which the storage commitment request was received is not open anymore.

3.3.2.1 Real-World Activity - Send Storage Commitment Request

3.3.2.1.1 Associated Real-World Activity - Send Storage Commitment Request

The user has sent (or archived) images to another DICOM node, which is configured as storage commitment SCP. *syngo* will automatically attempt to send a storage commitment request for this images.

3.3.2.1.2 Proposed Presentation Contexts - Send Storage Commitment Request

Iso C 3D Storage Commitment AE will propose Presentation Contexts as shown in the following table:

Table 7: Initiation presentation context Storage Commitment Request

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
Storage Commitment Push Model SOP Class	. 1.2.840.10008.1.201	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	12.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

3.3.2.1.3 SOP Specific Conformance Statement - Send StorageCommitment Request

The SCU sends the N-ACTION-RQ message and waits for the N-ACTION-RSP. After receiving this, the transaction is marked as “waiting”.

Depending on a configuration value, the association will be closed or kept open. In the first case, there is another configurable value giving the number of minutes (by default 60) to wait for the corresponding N_EVENT_REPORT. In the second case, this time is the (also configurable) time-out for the association. For both cases, if the N_EVENT_REPORT does not arrive during the configured time, the transaction will be marked as failed.

If the N_EVENT_REPORT received has the status of "complete - failure exists", the transaction is marked as failed, else the transaction is marked as "completed"; In both cases, a message is shown to the user.

Storage Commitment is supported for all the SOP class UIDs as mentioned in *’Acceptable presentation contexts Storage’*.

The Referenced Study Component Sequence is not supported.

Storage Media File-Set ID and UID Attributes will not be supported in the N-ACTION primitive invoked by the Storage Commitment SCU.

3.3.2.2 Real World Activity - Receive Storage Commitment Response

3.3.2.2.1 Associated Real World Activity - Receive Storage Commitment Response

Iso C 3D Storage Commitment AE has sent a Storage Commitment Request and, being configured to receive response on a separate association, has closed the association, and now it gets an association request from the Storage Commitment SCP that want to send the results.

Acting as an SC-SCP, Iso C 3D Storage Commitment AE received an Storage Commitment request, carried out the request, and is ready to send back the response, but the association is not open anymore. In this case it will initiate an association to send the N_EVENT_REPORT to the SCU.

3.3.2.2.2 Accepted Presentation Contexts - Receive Storage Commitment Response

Iso C 3D Storage Commitment AE will accept Presentation Contexts as shown in the following table:

Table 8: : Initiation presentation context Storage Commitment Response

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	12.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None

3.3.2.2.3 SOP Specific Conformance Statement - Receive Storage Commitment Response

Storage Media File-Set ID and UID Attributes will not be supported in the N-EVENT-REPORT primitive invoked by the Storage Commitment SCP.

3.3.3 Association Acceptance Policy

The Iso C 3D Storage Commitment AE accepts an association in two cases: when acting as SCP and an association request for Storage Commitment Push model arrives, and when acting as SCU if configured to receive N-EVENT-REPORT on a separate association.

3.3.3.1 Real World Activity - Receive Storage Commitment Request

3.3.3.1.1 Associated Real-World Activity - Receive Storage Commitment Request

An association request arrives for Iso C 3D Storage Commitment Push Model.

3.3.3.1.2 Accepted Presentation Contexts - Receive Storage Commitment Request

syngo Storage Commitment AE will accept Presentation Contexts as shown in the following table:

Table 9: : Presentation context accepted for Storage Commitment

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20..1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	12.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCP	None

3.3.3.1.2 SOP Specific Conformance Statement - Receive Storage Commitment Request

Note

Only one N-ACTION-RQ per association is currently supported by the Storage Commitment SCP.

Storage Media File-Set ID and UID Attributes will not be supported in the N-EVENT-REPORT primitive invoked by the Storage Commitment SCP.

3.3.3.2 Real World Activity - Receive Storage Commitment Response

3.3.3.2.1 Associated Real World Activity - Receive Storage Commitment Response

Iso C 3D Storage Commitment AE has sent a Storage Commitment Request and, being configured to receive response on a separate association, has closed the association, and now it gets an association request from the Storage Commitment SCP that want to send the results.

3.3.3.2.2 Accepted Presentation Contexts - Receive Storage Commitment

Response

Iso C 3D Storage Commitment AE will accept Presentation Contexts as shown in the following table:

Table 10: : Presentation context accepted for Storage Commitment

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1	Implicit VR Little Endian Explicit VR Big Endian Explicit VR Little Endian	12.840.10008.1.2 1.2.840.10008.1.2.2 1.2.840.10008.1.2.1	SCU	None

3.3.3.2.3 SOP Specific Conformance Statement - Receive Storage Commitment Response

If the N_EVENT_REPORT received has the status of "complete - failure exists", the trans actionis marked as failed, else the transaction is marked as "completed"; In both cases, a message is shown to the user.

3.4 Query/Retrieve AE Specification

The Query/Retrieve SCU request that the remote SCP perform a match of all keys specified in the request, against the information in its database and the identified images will be moved or retrieved to the same or a different storage association.

The Query/Retrieve SCP responds to queries based on the records based on its database and images will be send to the requesting SCU or to a different storage destination.

Iso C 3D DICOM products provide Standard Conformance to the following DICOM V3.0 SOP Classes as SCU and SCP (no API available, low level usage):

Table 11: SOP Classes as an SCU

SOP Class Name	SOP Class UID
Patient Root Query/Retrieve Information Model – FIND	1.2.840.10008.5.1.4.1.2.1.1
Patient Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.1.2
Study Root Query/Retrieve Information Model- FIND	1.2.840.10008.5.1.4.1.2.2.1
Study Root Query/Retrieve Information Model – MOVE	1.2.840.10008.5.1.4.1.2.2.2

3.4.1 Association Establishment Policies

3.4.1.1 General

The configuration of the Iso C 3D DICOM query/retrieve application defines the Application Entity Titles, the port numbers and of course the host name and net address.

3.4.1.2 Number of Associations

The Iso C 3D DICOM Query/Retrieve AE initiates several association at a time, one for each query/retrieve request being processed.

3.4.1.3 Asynchronous Nature

The Iso C 3D DICOM AE does not support asynchronous communication (multiple outstanding transactions over a single association).

3.4.1.4 Implementation Identifying Information

The Iso C 3D DICOM software provides a single Implementation Class UID of

1.3.12.2.1107.5.12.6"

and an Implementation Version Name of

• “VB10H_VB00B”.

3.4.2 Association Initiation Policy

The Query/Retrieve SCU and SCP establish an association by using the DICOM association services. During association establishment the Query/Retrieve application entities negotiate the supported SOP classes to exchange the capabilities of the SCU and the SCP.

The following DIMSE-C operations are supported as SCU:

- C-FIND
- C-MOVE

3.4.2.1 Real World Activity – Find SCU

3.4.2.1.1 Associated Real-World Activity – Find SCU

The associated Real-World activity is to initiate query request to an SCP with the query model Patient Root, Study Root and Patient/Study Only.

3.4.2.1.2 Proposed Presentation Contexts – Find SCU

The Iso C 3D DICOM application will propose Presentation Contexts as shown in the following table:

Table 12: Proposed presentation Context Find SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name List	UID List		
PatientRoot Find Query/Retrieve	1.2.840.10008.5.1. 4.1.2.1.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	See Note
Study Root Query/Retrieve Find -	1.2.840.10008.5.1. 4.1.2.2.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	See Note

It is configurable which of the two query models (or both) are to be used by the Siemens Query SCU application.

Note

C-FIND Extended Negotiation will be NOT supported by the SCU.

3.4.2.1.3 SOP Specific Conformance Statement - Find SCU

The Iso C 3D DICOM DICOM Query/Retrieve SCU supports hierarchical queries with all mandatory search keys. On each level, the unique attributes of all previous levels are also sent (values are provided by the user by selection from a list). For instance for a query using the patient root model on Series level, the Patient ID of the current selected patient and the Study Instance UID of the current selected study are included in the message.

The *Table* Table 13**:** query attributes*:* describes the search keys for the two query models (Patient Root and Study Root) that the *syngo* Query / Retrieve application supports as an SCU. Matchings are either wildcard, which means that the user can supply a string containing wildcards, either universal, which means that the attribute is returned no matter what value it has.

Table 13: query attributes

Attribute name	**Tag**	**Type**	**Matching**	**user input**	**return value displayed**
Patient level[a]					
Patient name	(0010,0010)	R	wildcard	enter value	yes
Patient id	(0010,0020)	U	wildcard	enter value	yes
Patient's birth date	(0010,0030)	O	universal (Null)	-	yes
Patient's sex	(0010,0040)	O	Universal (Null)	-	yes
Number of Patient related studies	(0020,1200)	O	universal (Null)		yes
Number of Patient relates series	(0020,1202)	O	universal (Null)		yes
Number of Patient related instances	(0020,1204)	O	universal (NULL)		-yes
Study level					
Patient name [b]	(0010,0010)	R	wildcard	enter value	yes
Patient ID [b]	(0010,0020)	R	wildcard c	enter value	yes

Study instance UID	(0020,000D)	U	single value	select from list	
Study id	(0020,0010)	R	universal (Null)	-	yes
Study date	(0008,0020)	R	universal (Null)	-	yes
Study time	(0008,0030)	R	universal (Null)	-	yes
Accession number	(0008,0050)	R	universal (Null)	-	yes
Accession number	(0008,1030)	O	universal (Null)	-	yes
Study description	(0008,1030)	O	universal		yes
Referring physician's Name	(0008,0090)	O	Universal (NULL		-yes
Name of physician reading study	(0008,8060)	O	Universal (NULL		yes
Modalities in Study	(0008,0061)	O	universal (NULL)		yes
Storage Media File Set ID	(0008,0130)	O	universal (NULL)		yes
Retrieve AE Title	(0008,0054)	O	universal (NULL)		-yes
Number of study related series	(0020,1206)	O	universal (NULL)		yes
Number of study related instances	(0020,1208)	O	universal (NULL)		yes

Table11: Patient root and Study Root query attributes

Attribute name	**Tag**	**Type**	**Matching**	**user input**	**return value displayed**

Series level					
Series instance UID	(0020,000E)	U	single value	select from list	-
Series number	(0020,0011)	R	universal (NULL)	-	yes
Modality	(0008,0060)	R	universal (NULL)	-	yes
Series date	(0008,0021)	O	universal (NULL)	-	yes
Series time	(0008,0031)	O	universal (NULL)	-	yes
Study ID	(0020,0010)	O	universal (NULL)	-	yes
Series description	(0008,103E)	O	universal (NULL)	-	yes
Series description	(0008,103E)	O	universal (NULL)	-	yes
Storage Media File Set ID	(0008,0130)	O	universal (NULL)	-	yes
Retrieve AE Title	(0008,0054)	O	universal (NULL)	-	yes
Protocol name	(0018,1030)	O	universal (NULL)	-	yes
Performed procedure step start date	(0040,0244)	O	universal (NULL)	-	yes
Performed procedure step start time	(0040,0245)	O	universal (NULL)	-	yes
Number of series related instances	(0020,1209)	O	universal (NULL)	-	yes
Image level					
SOP instance UID	(0008,0018)	U	universal (NULL)	-	yes
Instance Number	(0020,0013)	R	universal (NULL)	-	yes

Storage Media File Set ID	(0008,0130)	O	universal (NULL)	-	yes
Retrieve AE Title	(0008,0054)	O	universal (NULL)	-	yes
Image date	(0008,0023)	O	universal (NULL)l	-	yes
Image time	(0008,0033)	O	universal (NULL)	-	yes
Number of Frames	(0028,0008)	O	universal (NULL)l	-	yes
Image comments	(0020,4000)	O	universal (NULL)	-	yes

a. Only for Patient Root information model

b. Only for Study Root information model

c. Always a "*" is added to the string supplied by the user

3.4.2.2 Real World Activity - Move SCU

3.4.2.2.1 Associated Real-World Activity - Move SCU

The operator uses the Iso C 3D DICOM Query application to enter the query values and then initiates the retrieval of all matching DICOM composite objects (like images) from the remote node.

This will generate retrieval requests to a remote C-MOVE SCP using the C-MOVE operation with the query model Patient Root, Study Root and Patient/Study Only. The Storage Service Class Conformance Statement of the SCP must describe the C-STORE service which is generated by the C-MOVE service.

3.4.2.2.2 Proposed Presentation Contexts - Move SCU

The Iso C 3D DICOM application will propose Presentation Contexts as shown in the following table:

Table 14: Proposed Presentation Context Move SCU

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotiation
PatientRoot Query/Retrieve Move	1.2.840.10008.5.1. 4.1.2.1.2	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	See Note
Study Root Query/Retrieve Move	1.2.840.10008.5.4.1.2.2.2.1.	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	See Note

Note

C-MOVE Extended Negotiation will be NOT supported by the SCU.

C-MOVE on Patient level is not supported by the application.

3.4.2.2.3 SOP Specific Conformance Statement - Move SCU

At association establishment time the C-MOVE presentation context shall be negotiated. The C-STORE sub-operations must be done on a different association to transfer images to another SCP of the Storage Service Class.

The Move SCU interprets following status codes:

Table 15: C_MOVE Response Status

Service Status	Meaning	Protocol Codes	Related Fields
Refused	Out of Resources - Unable to calculate number of matches Out of Resources - Unable to perform suboperations	A701 A702	(0000,0902) (0000,1020) (0000,1021) (0000,1022) (0000,1023)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
Failed	Unable to process	Cxxx	(0000,0901) (0000,0902)
Cancel	Sub-operations terminated due toCancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations Complete - One or more Failures of Warnings	B000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Success	Sub-operations Complete - No Failures or Warning	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)

3.4.3 Association Acceptance Policy

The Query/Retrieve SCU and SCP establish an association by using the DICOM association

services. During association establishment the Query/Retrieve application entities negotiate the supported SOP classes to exchange the capabilities of the SCU and the SCP.

The following DIMSE-C operations are supported as SCP:

- C-FIND
- C-GET
- C-MOVE
- C-FIND-CANCEL
- C-GET-CANCEL
- C-MOVE-CANCEL

The SCP does support multiple C-FIND requests over the same association, but not multiple C-GET or C-MOVE request.

3.4.3.1 Real World Activity - Find SCP

3.4.3.1.1 Associated Real-World Activity - Find SCP

The associated Real-World activity is to respond to query requests to an SCU with the query model Patient Root, Study Root and Patient/Study Only.

3.4.3.1.2 Proposed Presentation Contexts - Find SCP

The Iso C 3D DICOM AE will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotia-tion
Name	UID	Name List	UID List		
Patient Root Query/Retrieve Find	1.2.840.10008.5.1.4.1.2.1.1	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	See Note
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2		

Study Root Query/Re trieve Find	1.2.840.10008.5.14.1.2.2.1.	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	See Note
Patient/Study Only Query/ Retrieve Find	1.2.840.10008.5.1.4.1.2.3.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	See Note

Note:

C-FIND Extended Negotiation will be NOT supported by the SCP**.**

The order of preference in accepting a Transfer syntax is:

1. Explicit VR Little Endian
2. Explicit VR Big Endian
3. Implicit VR Little Endian

3.4.3.1.3 SOP Specific Conformance Statement - Find SCP

The Iso C 3D DICOM Query/Retrieve SCP supports hierarchical with all mandatory and optional search keys. The query attributes will be treated Case Sensitive. The supported attributes on the various levels of the three information models are listed in following tables: The following four tables describe the search keys for the four levels of query that the SCP supports.

3.4.3.1.3.1 Patient Root Information Model.

Table 19: Patient level attributes, Patient Root Information Model ation Model

Attribute name	Tag	Type	Matching
Patient name	(0010,0010)	R	single value, wildcard, universal
Patient id	(0010,0020)	U	single value, wildcard, universal
Patient's birth date	(0010,0030)	O	single value, range, universal
Patient's birth time	(0010,0032)	O	single value, range, universal
Patient's sex	(0010,0040)	O	single value, wildcard, universal
Ethnic group	(0010,2160)	O	single value, wildcard, universal
Patient comments	(0010,4000)	O	wildcard, universal
Number of Patient related studies	(0020,1200)	O	universal
Number of Patient relates series	(0020,1202)	O	universal
Number of Patient related instances	(0020,1204)	O	universal

Table 20: Study level attributes, Patient Root Information Model

Attribute name	Tag	Type	Matching
Study instance UID	(0020,000D)	U	single value, list of UIDs
Study id	(0020,0010)	R	single value, wildcard, universal
Study date	(0008,0020)	R	single value, range, universal
Study time	(0008,0030)	R	single value, range, universal
Accession number	(0008,0050)	R	single value, wildcard, universal
Referring physician's name	(0008,0090)	O	single value, wildcard, universal

Attribute name	Tag	Type	Matching
Study description	(0008,1030)	O	single value, wildcard, universal
Admitting diagnoses description	(0008,1080)	O	single value, wildcard, universal
Patient's age	(0010,1010)	O	single value, wildcard, universal
Patient's size	(0010,1020)	O	single value, universal
Patient's weight	(0010,1030)	O	single value, universal
Occupation	(0010,2180)	O	single value, wildcard, universal
Additional patient history	(0010,21B0)	O	wildcard, universal
Name of physician reading study	(0008,1060)	O	single value, wildcard, universal
Modalities in Study	(0008,0061)	O	multiple values, universal
Number of study related series	(0020,1206)	O	universal
Number of study related instances	(0020,1208)	O	universal

Table 21: Series level attributes, Patient Root Information Model

Attribute name	Tag	Type	Matching
Series instance UID	(0020,000E)	U	single value, list of UID
Series number	(0020,0011)	R	single value, universal
Modality	(0008,0060)	R	single value, wildcard, universal
Laterality	(0020,0060)	O	single value, wildcard, universal

Table 21: Series level attributes, Patient Root Information Model

Body part examined	(0018,0015)	O	single value, wildcard, universal
Patient position	(0018,5100)	O	single value, wildcard, universal
Smallest pixel value in series	(0028,0108)	O	single value, universal
Largest pixel value in series	(0028,0109)	O	single value, universal
Protocol name	(0018,1030)	O	single value, wildcard, universal
Series date	(0008,0021)	O	single value, range, universal
Series time	(0008,0031)	O	single value, range, universal
Series description	(0008,103E)	O	single value, wildcard, universal
Operators name	(0008,1070)	O	single value, wildcard, universal

Performing physician's name	(0008,1050)	O	single value, wildcard, universal
Performed procedure step start date	(0040,0244)	O	universal
Performed procedure step start time	(0040,0245)	O	universal
Number of series related instances	(0020,1209)	O	universal

Table 22: Image level attributes, Patient Root Information Model

Attribute name	Tag	Type	Matching
SOP instance UID	(0008,0018)	U	single value, list of UID
Image number	(0020,0013)	R	single value, universal
Image date	(0008,0023)	O	single value, range, universal
Image time	(0008,0033)	O	single value, range, universal
Modality	(0008,0060)	O	single value, wildcard, universal
Image comments	(0020,4000)	O	universal

3.4.3.1.3.2 Study Root Information Model

Table 23: Study level attributes, Study Root Information Model

Attribute name	Tag	Type	Matching
Patient name	(0010,0010)	R	single value, wildcard, universal
Patient id	(0010,0020)	R	single value, wildcard, universal
Patient's birth date	(0010,0030)	O	single value, range, universal
Patient's birth time	(0010,0032)	O	single value, range, universal
Patient's sex	(0010,0040)	O	single value, wildcard, universal
Patient comments	(0010,4000)	O	wildcard, universal
Number of Patient related studies	(0020,1200)	O	universal
Number of Patient relates series	(0020,1202)	O	universal
Number of Patient related instances	(0020,1204)	O	universal
Study instance UID	(0020,000D)	U	single value, list of UIDs
Study id	(0020,0010)	R	single value, wildcard, universal
Study date	(0008,0020)	R	single value, range, universal
Study time	(0008,0030)	R	single value, range, universal

Attribute name	Tag	Type	Matching
Accession number	(0008,0050)	R	single value, wildcard, universal
Referring physician's name	(0008,0090)	O	single value, wildcard, universal
Study description	(0008,1030)	O	single value, wildcard, universal
Admitting diagnoses description	(0008,1080)	O	single value, wildcard, universal
Patient's age	(0010,1010)	O	single value, wildcard, universal
Patient's size	(0010,1020)	O	single value, universal
Patient's weight	(0010,1030)	O	single value, universal
Occupation	(0010,2180)	O	single value, wildcard, universal
Additional patient history	(0010,21B0)	O	wildcard, universal
Name of physician reading study	(0008,8060)	O	single value, wildcard, universal
Modalities in Study	(0008,0061)	O	multiple values, universal
Number of study related series	(0020,1206)	O	universal
Number of study related instances	(0020,1208)	O	universal

Table 24: *Series level attributes, Study Root Information Model*

Attribute name	Tag	Type	Matching
Series instance UID	(0020,000E)	U	single value, list of UID
Series number	(0020,0011)	R	single value, universal
Modality	(0008,0060)	R	single value, wildcard, universal
Laterality	(0020,0060)	O	single value, wildcard, universal
Body part examined	(0018,0015)	O	single value, wildcard, universal
Patient position	(0018,5100)	O	single value, wildcard, universal
Smallest pixel value in series	(0028,0108)	O	single value, universal
Largest pixel value in series	(0028,0109)	O	single value, universal
Protocol name	(0018,1030)	O	single value, wildcard, universal
Series date	(0008,0021)	O	single value, range, universal
Series time	(0008,0031)	O	single value, range, universal
Series description	(0008,103E)	O	single value, wildcard, universal
Operators name	(0008,1070)	O	single value, wildcard, universal

Performing physician's name	(0008,1050)	O	single value, wildcard, universal
Performed procedure step start date	(0040,0244)	O	universal
Performed procedure step start time	(0040,0245)	O	universal
Number of series related instances	(0020,1209)	O	universal

Table 25 Image level attributes, Study Root Information Model

Attribute name	Tag	Type	Matching
SOP instance UID	(0008,0018)	U	single value, list of UID
Image number	(0020,0013)	R	single value, universal
Image date	(0008,0023)	O	single value, range, universal
Image time	(0008,0033)	O	single value, range, universal
Modality	(0008,0060)	O	single value, wildcard, universal
Image comments	(0020,4000)	O	universal

3.4.3.1.3.3 Patient Study Only Information models

Table 26: *Patient instance level, Patient Study Only Information Model*

Attribute name	Tag	Type	Matching
Patient name	(0010,0010)	R	single value, wildcard, universal
Patient id	(0010,0020)	U	single value, wildcard, universal
Patient's birth date	(0010,0030)	O	single value, range, universal
Patient's birth time	(0010,0032)	O	single value, range, universal
Patient's sex	(0010,0040)	O	single value, wildcard, universal
Ethnic group	(0010,2160)	O	single value, wildcard, universal
Patient comments	(0010,4000)	O	wildcard, universal
Number of Patient related studies	(0020,1200)	O	universal
Number of Patient relates series	(0020,1202)	O	universal
Number of Patient related instances	(0020,1204)	O	universal

Table 27: *Study level attributes, Patient Study Only Information Model*

Attribute name	Tag	Type	Matching

Attribute name	Tag	Type	Matching
Study instance UID	(0020,000D)	U	single value, list of UIDs
Study id	(0020,0010)	R	single value, wildcard, universal
Study date	(0008,0020)	R	single value, range, universal
Study time	(0008,0030)	R	single value, range, universal
Accession number	(0008,0050)	R	single value, wildcard, universal
Referring physician's name	(0008,0090)	O	single value, wildcard, universal
Study description	(0008,1030)	O	single value, wildcard, universal
Admitting diagnoses description	(0008,1080)	O	single value, wildcard, universal
Patient's age	(0010,1010)	O	single value, wildcard, universal
Patient's size	(0010,1020)	O	single value, universal
Patient's weight	(0010,1030)	O	single value, universal
Occupation	(0010,2180)	O	single value, wildcard, universal
Additional patient history	(0010,21B0)	O	wildcard, universal
Name of physician reading study	(0008,8060)	O	single value, wildcard, universal
Modalities in Study	(0008,0061)	O	multiple values, universal
Number of study related series	(0020,1206)	O	universal
Number of study related instances	(0020,1208)	O	universal

ATTENTION! In DICOMwildcard queries the symbol'?' is treated as'*' by Find SCP. So a wildcard query with “?abc*” is actually treated as “*abc*”

If the value for the unique key PatientID is not known, it may be returned empty.

The C_FIND_RSP message will contain the following attributes:

- Specific Character Set (0008,0005)
- Query/Retrieve Level (0008,0052) from the C_FIND_RQ
- RetrieveAETitle (0008,0054):this value is NULL except for the lowest level of the query model (Image level for Patient Root or Study Root and Study level for Patient/Study Only)
- Storage-Media FileSet ID (0088,0130) at level study, series and image
  If Storage-Media FileSet ID is not present a NULL value will be returned
- attributes requested by C_FIND_RQ

Relational queries are not supported.

A Remote DICOM AE can cancel the query by sending a C_CANCEL_FIND_RQ message.If

the Find SCP receives C_CANCEL_FIND_RQ before it has completed the processing of the matches it shall stop the database matching process and return a status of Cancelled to the Remote DICOM AE.

The Find SCP returns following status codes:

Table 28: C-FIND return status

Service Status	Meaning	Protocol Codes	Related Fields
Refused	Out of Resources	A700	(0000,0902)
Failed	Identifier does not match SOP Class Unable to process	A900 C001	(0000,0901) (0000,0902) (0000,0901) (0000,0902)
Cancel	Matching terminated due to Cancel request	FE00	None
Success	Matching is complete - No final Identifier is supplied	0000	None
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF00 FF01	Identifier Identifier

3.4.3.2 Real World Activity - Get SCP

3.4.3.2.1 Associated Real-World Activity - Get SCP

The associated Real-World activity is to respond to retrieve requests initiated from an SCU. The SCP supports the query model Patient Root, Study Root and Patient/Study Only. The StorageService Class Conformance Statement describes the C-STORE service which is generated by the C-GET service.

3.4.3.2.2 Proposed Presentation Contexts - Get SCP

The Iso C 3D DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotia-tion
Patient Root Query/Re-trieve Get	1.2.840.10008.5.1. 4.1.2.1.3	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	See Note
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2		
Study Root Query/Re-trieve Get	1.2.840.10008.5.1. 4.1.2.2.3	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	See Note
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2		
Patient/Study Only Query/ Retrieve Get	1.2.840.10008.5.1.4.1.2.3.3.	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	See Note
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2		

Note: C-GET Extended Negotiation will be supported by the SCP.

Note:C-GET Extended Negotiation will be NOT supported by the SCP.

The order of preference in accepting a Transfer syntax is:

1. Explicit VR Little Endian
2. Explicit VR Big Endian
3. Implicit VR Little Endian

3.4.3.2.3 SOP Specific Conformance Statement - Get SCP

At association establishment time the C-GET presentation context must be negotiated along with the C-STORE sub-operations which must be accomplished on the same association as the C-GET operation.

The Get SCP returns following status codes:

Table 16: C-GET return status

Service Status	Meaning	Protocol Codes	Related Fields
Refused	Out of Resources - Unable to calculate number of matches Out of Resources - Unable to perform suboperations	A701 A702	(0000,0902) (0000,1020) (0000,1021) (0000,1022) (0000,1023)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
Failed	Unable to process	C001	(0000,0901) (0000,0902)
Cancel	Sub-operations terminated due toCancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations Complete - One or more Failures of Warnings	B000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Success	Sub-operations Complete - No Failures or Warning	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)

3.4.3.3 Real World Activity - Move SCP

3.4.3.3.1 Associated Real-World Activity - Move SCP

The associated Real-World activity is to respond to retrieve requests to an SCU. The SCP supports the query model Patient Root, Study Root and Patient/Study Only. The Storage ServiceClass Conformance Statement describes the C-STORE service which is generated by the C-MOVE service.

3.4.3.3.2 Proposed Presentation Contexts - Move SCP

The Iso C 3D DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotia-tion
Patient Root. Query/Rerieve Move -	1.2.840.10008.5.1.4.1.2.1.2	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	See Note
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2		
Study Root Query/Retrieve Move -	1.2.840.10008.5.1.4.1.2.2.2	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCP	See Note
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2		
Patient/Study Only Query/ RetrieveMove	1.2.840.10008.5.1.4.1.2.3.2	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCP	See Note

Note

C-MOVE Extended Negotiation will be NOT supported by the SCP.

The order of preference I accepting a Transfer syntax is:

1. Explicit VR Little Endian
2. Explicit VR Big Endian
3. Implicit VR Little Endian

3.4.3.3.3 SOP Specific Conformance Statement - Move SCP

At association establishment time the C-MOVE presentation context shall be negotiated. The C-STORE sub-operations is done on a different association, specified in the C-MOVE request, to transfer images to another SCP of the Storage Service Class.

Table 17: C-MOVE return status

Service Status	Meaning	Protocol Codes	Related Fields
Refused	Out of Resources - Unable to calculate number of matches	A701	(0000,0902)
	Out of Resources - Unable to perform suboperations	A702	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Failed	Identifier does not match SOP Class	A900	(0000,0901) (0000,0902)
Failed	Unable to process	C001	(0000,0901) (0000,0902)
Cancel	Sub-operations terminated due to Cancel Indication	FE00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Warning	Sub-operations Complete One or more Failures of Warnings	B000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Pending	Sub-operations are continuing	FF00	(0000,1020) (0000,1021) (0000,1022) (0000,1023)
Success	Sub-operations Complete – No Failures or Warning	0000	(0000,1020) (0000,1021) (0000,1022) (0000,1023)

3.5 Print AE Specification

The print management SCU invokes print management DIMSE services to transfer images from the local AE to the remote SCP AE to print the images with the defined film format and size on a selected network DICOM hardcopy printer. See DICOM part 4 annex H.

Iso C 3D DICOM products provide Standard Conformance to the following DICOM V3.0 Basic Grayscale Print Management Meta SOP Classe Basic Color Print Management Meta SOP Class and the optional Print Job SOP Class as an SCU:

Table 18: Basic Gray Scale Print Management Meta SOP-Classes

SOP Class Name	SOP Clasds UID	Usage SCU/SCP
Basic Grayscale Print Management Meta SOP Class	1.2.840.10008.5.1.1.9	M/M
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	M/M
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	M/M
- Basic Grayscale Image Box SOP Class	1.2.840.10008.5.1.1.4	M/M
- Printer SOP Class	1.2.840.10008.5.1.1.16	M/M
Print Job SOP Class	1.2.840.10008.5.1.1.14	U/U
Presentation LUT SOP Class	1.2.840.10008.5.1.1.23	U/U

Table 19: Basic Color Print Management Meta SOP-Classes

SOP Class Name	SOP Class UID	Usage SCU/SCP
Basic Color Print Management Meta SOP Class	1.2.840.10008.5.1.1.18	M/M
- Basic Film Session SOP Class	1.2.840.10008.5.1.1.1	M/M
- Basic Film Box SOP Class	1.2.840.10008.5.1.1.2	M/M
- Basic Color Image Box SOP Class	1.2.840.10008.5.1.1.4.1	M/M
- Printer SOP Class	1.2.840.10008.5.1.1.16	M/M
Print Job SOP Class	1.2.840.10008.5.1.1.14	U/U

3.5.1 Association Establishment Policies

3.5.1.1 General

The configuration of the Iso C 3D DICOM print management SCU defines the Application Entity Titles, the port numbers and of course the host name and net address.

3.5.1.2 Number of Associations

The Iso C 3D DICOM application initiates one/several association(s) at a time, one for each transfer request being processed.

3.5.1.3 Asynchronous Nature

The Iso C 3D DICOM software does not support asynchronous communication (multiple outstanding transactions over a single association).

3.5.1.4 Implementation Identifying Information

The Iso C 3D DICOM software provides a single Implementation Class UID of

1.3.12.2.1107.5.12.6"

and an Implementation Version Name of

• “VB10H_VB00B”.

3.5.2 Association Initiation Policy

The Print Management SCU and SCP establish an association by using the DICOM association services. During association establishment the Print Managment application entities negotiate the supported SOP classes to exchange the capabilities of the SCU and the SCP. If the SCU supports only mandatory SOP classes, the negotiation of optional capabilities is not necessary.

3.5.2.1 Real-World Activity

3.5.2.1.1 Associated Real-World Activity

The associated Real-World activity is to print over a network a set of images on a film sheet with one or more copies. The images are converted to Standard\1-1. If the response from the remote application contains a status other than Success or Warning the association is aborted.

3.5.2.1.2 Proposed Presentation Contexts

The Iso C 3D DICOM application will propose Presentation Contexts as shown in the following table:

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotia-tion

Basic Grayscale Print Management Meta SOP class	1.2.840.10008.5.1.1.9	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic film session SOP class	1.2.840.10008.5.1.1.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic film box SOP class	1.2.840.10008.5.1.1.2	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic grayscale image box SOP class	1.2.840.10008.5.1.1.4	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Printer SOP class	1.2.840.10008.5.1.1.16	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Print Job SOP class	1.2.840.10008.5.1.1.14	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Presentation LUT SOP class	1.2.840.10008.5.1.1.23	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotia-tion
Basic Color Print Manage-ment Meta SOP class	1.2.840.10008.5.1.1.18	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic film session SOP class	1.2.840.10008.5.1.1.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Basic film box SOP class	1.2.840.10008.5.1.1.2	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

Basic color image box SOP class	1.2.840.10008.5.1.1.4.1	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Printer SOP class	1.2.840.10008.5.1.1.16	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None
Print Job SOP class	1.2.840.10008.5.1.1.14	DICOM Implicit VR Little Endian Transfer Syntax DICOM Explicit VR Little Endian Transfer Syntax DICOM Explicit VR Big Endian Transfer Syntax,	1.2.840.10008.1.2 1.2.840.10008.1.2.1 1.2.840.10008.1.2.2	SCU	None

3.5.2.1.3 SOP Specific Conformance Statement

The Iso C 3D DICOM SCU conforms to the DICOM Basic Grayscale Print Management Class. The application uses a setting platform to define the properties of the connected DICOM SCP,

e.g.:

• maximum number of print jobs in the queue

• maximum number of print copies

• supported film sizes of the connected DICOM SCP

• supported film formats of the DICOM SCP

• lookup table definition.

The printing is only suspended in the case of a failure return status of the SCP.

3.5.2.1.3.1 SOP Specific Conformance to Basic Film Session SOP Class

The Basic Film Session information object definition describes all the user defined parameter

which are common for all the films of a film session. The Basic Film Session refers to one or more Basic Film Boxes that are printed on one hardcopy printer.

The Iso C 3D DICOM Print application supports the following DIMSE Service Elements for the

Basic Film Session SOP class as SCU:

-N-CREATE

-N-DELETE

The Basic Film Session SOP class N-CREATE_RQ (SCU) uses following attributes:

Table 20: Used Basic Film Session N-Create attributes

Attribute name	Tag	Usage SCU	Supported Values
Number of Copies	(2000,0010)	U	
Medium Type	(2000,0030)	U	BLUE FILM CLEAR FILM PAPER
Film Destination	(2000,0040	U	MAGAZINE PROCESSOR

The Affected SOP Instance UID received in N_CREATE_RSP message from SCP will be saved internally and used for later requests like N_DELETE_RQ on the Basic Film Session SOP Class - see table below:)

Table 21: Attributes of the N_DELETE_RQ on the Basic Film Session SOP Class

Attribute name	Tag	Source of information
Requested SOP Instance UID	(0008,0018)	Affected SOP Instance UID of N_CREATE_RSP on Basic Film Session

The N_DELETE_RQ on the Basic Film Session SOP Class is used to delete the complete Basic Film Session SOP Instance hierarchy.

The Basic Film Session SOP class interprets following status codes (from N_CREATE_RSP, N_DELETE_RSP messages):

Table 22: Basic Film Session SOP status

Service Status	Meaning	Protocol Codes
Failure	Film session SOP instances hierarchy does not contain film box SOP instances	C600
	Unable to create print job, print queue is full	C601

	Image size is larger than images box size	C603
Warning	Memory allocation not supported	B600
	Film session printing is not supported	B601
Warning	Film box does not contain image box (empty page)	B602
Success	Film belonging to the film session are accepted for printing	0000

3.5.2.1.3.2 SOP Specific Conformance to Basic Film Box SOP Class

The Basic Film Box information object definition describes all the user defined parameter of one film of the film session. The Basic Film Box information description defines the presentation parameters which are common for all images on a given sheet of film.

The Basic Film Box refers to one or more Image Boxes.

Supported as SCU are:

- N-CREATE
- N-ACTION
- N-DELETE

The Basic Film Box SOP class N_CREATE_RQ message uses following attributes (the used values for each attribute depend how the DICOM Printer is configured within the Iso C 3D product):

Table 23: Used Film Box N-CREATE_RQ attributes

Attribute name	Tag	Usage SCU	Supported Values
Image Display Format	(2010,0010)	M	Standard\1-1
Referenced Film Session Sequence	(2010,0500)	M	
>Referenced SOP Class UID	(0008,1150)	M	1.2.840.10008.5.1.1.1
>Referenced SOP Instance UID	(0008,1155)	M	
Film Orientation	(2010,0040)	M	PORTRAIT
Film Size ID	(2010,0050)	M	8INX10IN 10INX12IN 10INX14IN 11INX14IN 11INX17IN 14INX14IN 14INX17IN 24CMX24CM 24CMX30CM
Magnification Type	(2010,0060)	M	BILINEAR CUBIC NONE

			REPLICATE
Max Density	(2010,0130)	U	
Max Density	(2010,0120)	U	

The N_CREATE_RSP message from the SCP then contains the References Image Box Sequence with its SOP Class and Instance UIDs which is stored internally and then used for the Basic Image Box SOP Class N-SET RQ messages.

After all parameters for the Image boxes on the filmsheet have been set then the Iso C 3D DICOM print application SCU will issue a N_ACTION_RQ message with the SOP Instance UID of the Basic Film Box (returned in N_CREATE_RSP of Basic Film Box SOP class) and the Action Type ID set to 1.

The Affected SOP Instance UID received in N_CREATE_RSP message from SCP will be saved internally and can be used later for N_DELETE_RQ request on the Basic Film Box SOP Class - see table below:)

Table 24: Attributes of the N_DELETE_RQ on the Basic Film Session SOP Class

Attribute name	Tag	Source of information
Requested SOP Instance UID	(0008,0018)	Affected SOP Instance UID of N_CREATE_RSP on Basic Film Box

The Basic Film Box SOP class interprets following status codes from the N_CREATE_RSP, N_DELETE_RSP and N_ACTION_RSP messages:

Table 25: Basic Film Box SOP Status

Service Status	Meaning	Protocol Codes
Failure	Unable to create print job, print queue is full	C602
	Image size is larger than images box size	C603
Warning	Film box does not contain image box (empty page)	B603
	Requested MinDensity or MaxDensity outside of printer's operating range	B605
	Film accepted for printing	0000

3.5.2.1.3.3 SOP Specific Conformance to Basic Grayscale Image Box SOP Class

The Basic Grayscale Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data which apply to a single image of a sheet of film.

The Grayscale Image Box SOP class uses only the N_SET_RQ with the following attributes

Table 26: Used Basic Greyscale Image Box N_SET attributes

Attribute name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
Basic Grayscale Image Sequence	(2020,0110)	M	
>Samples Per Pixel	(0028,0002)	M	1
>Photometric Interpretation	(0028,0004)	M	MONOCHROME2 for grayscale images
>Rows	(0028,0010)	M	
>Columns	(0028,0011)	M	
>Pixel Aspect Ratio	(0028,0034)	M	
>Bits Allocated	(0028,0100)	M	8
>Bits Stored	(0028,0101)	M	8
>High Bit	(0028,0102)	M	7
>Pixel Representation	(0028,0103)	M	0
>Pixel Data	(7FE0,0010)	M	

The Grayscale Image Box SOP class interprets following status codes:

Table 27: Basic Grayscale Image Box SOP status

Service Status	Meaning	Protocol Codes
Warning	Requested MinDensity or MaxDensity outside of printer's operating range	B605
Failure	Image contains more pixel than printer can print in Image box	C603
	Insufficient memory in printer to store the image	C605
Success		0000

3.5.2.1.3.4 SOP Specific Conformance to Basic Color Image Box SOP Class

The Basic Color Image Box information object definition is the presentation of an image and image related data in the image area of a film. The Basic Image Box information describes the presentation parameters and image pixel data which apply to a single image of a sheet of film.

The Color Image Box SOP class uses only the N_SET_RQ with the following attributes

Table 28: Used Basic Color Image Box N-SET attributes

Attribute name	Tag	Usage SCU	Supported Values
Image Position	(2020,0010)	M	1
Basic Color Image Sequence	(2020,0111)	M	
>Samples Per Pixel	(0028,0002)	M	3
>Photometric Interpretation	(0028,0004)	M	RBG

>Planar Configuration	(0028,0006)	M	0
>Rows	(0028,0010)	M	
>Columns	(0028,0011)	M	
>Pixel Aspect Ratio	(0028,0034)	M	
>Bits Allocated	(0028,0100)	M	8
>Bits Stored	(0028,0101)	M	8
>High Bit	(0028,0102)	M	7
>Pixel Representation	(0028,0103)	M	0
>Pixel Data	(7FE0,0010)	M	

The Color Image Box SOP class interprets following status codes:

Table 29: Basic Color Image Box SOP status

Service Status	Meaning	Protocol Codes
Warning	Image size larger than image box size.	B604
Failure	Image contains more pixel than printer can print in Image box	C603
	Insufficient memory in printer to store the image	C605
Success		0000

3.5.2.1.3.5 SOP Specific Conformance to Presentation LUT SOP Class

The Presentation LUT Information Object is the Presentation LUT. The objective of the Presentation

LUT is to realize image hardcopy printing tailored for specific modalities, applications,

and user preferences.

The output of the Presentation LUT is Presentation Values (P-Values). P-Values are approximately

related to human perceptual response. They are intended to facilitate common input for

hardcopy. P-Values are intended to be independent of the specific class or characteristics of the

hardcopy device.

Table 43: Attributes of the N_CREATE_RQ on the Presentation LUT SOP Class

Attribute name	Tag	Usage SCU	Supported Values
Presentation LUT Shape	(2050,0020).	U	IDENTITY

Table 44: Attributes of the N_CREATE_RSP on the Presentation LUT SOP Class

Attribute of Presentation LUT	Type	Value list	Note
Affected SOP Instance UID	CString	-	After receiving the N_CREATE_RSP, the Affected SOP Instance UID has to be saved

			and used for later actions(e.g. N_CREATE_RQ a , N_DELETE_RQ) on the Presentation LUT SOP Class.

a. Note: N_CREATE_RQ on the Basic Film Box requires this UID to be set , if the Presentation LUT SOP class is to be supported by the SCU.

b. Note: N_CREATE_RQ on the Basic Film Box is required to include the attributes: Illumination, and Reflective Ambient Light, if the Presentation LUT SOP class is to be supported by the SCU.

3.5.2.1.3.5 SOP Specific Conformance to Printer SOP Class

The Printer SOP Class is the possibility to monitor the status of the hardcopy printer in a synchronous and an asynchronous way.

The SCU uses the mandatory N-EVENT Report DIMSE service to monitor the changes of the printer status in an asynchronous way.

It can directly ask the Print SP for its status or can receive Events from the Print SCP asynchronously:

N-GET as SCU

N-EVENT-REPORT as SCU

In both cases the following information is supported:

Table 30: Used Printer N-EVENT report

Event type name	Event	Attributes	Tag	Usage SCU
Normal	1			
Warning	2	Printer Status Info	(2110,0020)	U
Failure	3	Printer Status Info	(2110,0020)	U

Table 31: Mandatory Printer N-Get Attributes

Attribute name	Tag	Usage SCP
Printer Status	(2110,0010)	NORMAL FAILURE WARNING
Printer Status Info	(2110,0020)	see **Fehler! Verweisquelle konnte nicht gefunden werden.**

3.5.2.1.3.6 SOP Specific Conformance to Print Job SOP Class

The Print Job SOP Class is the possibility to monitor the execution of the print process.

The Iso C 3D DICOM Print application supports the optional N-EVENT Report DIMSE

service to receive the changes of the print job status in an asynchronous way

It can receive Events from the Print SCP asynchronously:

- N-EVENT-REPORT

The following information is supported:

Table 32: Used Print Job N-EVENT report

Event type name	Event	Attributes	Tag	Usage SCU
Normal	1	Executiopn Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	- (Print Queue Management SOP Class not sup-ported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Printing	2	Executiopn Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	- (Print Queue Manage-ment SOP Class not sup-ported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Done	3	Executiopn Status	(2100,0030)	U
		Print Job ID	(2100,0010)	.- (Print Queue Manage-ment SOP Class not sup-ported
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U
Failure	4	Executiopn Status Info	(2100,0030)	U
		Print Job ID	(2100,0010)	- (Print Queue Manage- ment SOP Class not sup-ported)
		Film Session Label	(2000,0050)	U
		Printer Name	(2110,0030)	U

3.5.2.1.3.7 Behavior of SCU when receiving information

The following tables document the behavior of the Iso C 3D system in response to messages

received for the printer SOP class and the print job SOP class.

Table 46:Printer Status Infos within Printer SOP Class/Execution Status Infos within Print Job SOP

Printer Status info/Execution Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
NORMAL	Camera is ready.	Camera is ready.	<None>/idle
BAD RECEIVE MGZ	There is a problem with the film receive magazine. Films from the printer cannot be transported into the magazine.	Problem with receive magazine.	<None>/interact
BAD SUPPLY MGZ	There is a problem with a film supply magazine. Films from this magazine cannot be transported into the printer.	Problem with supply magazine.	<None>/interact
CALIBRATING	Printer is performing self calibration, it is expected to be available for normal operation shortly.	Self calibration. Please wait.	<None>/idle
CALIBRATION ERR	An error in the printer calibration has been detected, quality of processed films may not be optimal.	Problem in calibration. Film quality may not be optimal.	<None>/interact
CHECK CHEMISTRY	A problem with the processor chemicals has been detected, quality of processed films may not be optimal.	Problem with chemistry. Film quality may not be optimal.	<None>/interact
CHECK SORTER	There is an error in the film sorter	Error in film sorter.	<None>/interact
CHEMICALS EMPTY	There are no processing chemicals in the processor, films will not be printed and processed until the processor is back to normal.	Camera chemistry empty. Please check.	<None>/interact
CHEMICALS LOW	The chemical level in the processor is low, if not corrected, it will probably shut down soon.	Camera chemistry low. Please check.	<None>/interact
COVER OPEN	One or more printer or processor covers, drawers, doors are open.	Camera cover, drawer or door open.	<None>/interact
ELEC CONFIG ERR	Printer configured improperly for this job.	Camera configured improperly for this job. Queue stopped.	Queue for this camera will be STOPPED/Queue stopped

Printer Status info/Execution Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
ELEC DOWN	Printer is not operating due to some unspecified electrical hardware problem.	Camera electrical hardware problem.	<None>/interact
ELEC SW ERROR	Printer not operating for some unspecified software error.	Camera software problem. Queue stopped.	Queue for this camera will be STOPPED/queue stopped
EMPTY 8x10	The 8x10 inch film supply magazine is empty.	8x10 film supply empty.	<None>/interact
EMPTY 8x10 BLUE	The 8x10 inch blue film supply magazine is empty.	8x10 blue film supply empty.	<None>/interact
EMPTY 8x10 CLR	The 8x10 inch clear film supply magazine is empty.	8x10 clear film supply empty.	<None>/interact
EMPTY 8x10 PAPR	The 8x10 inch paper supply magazine is empty.	8x10 paper supply empty.	<None>/interact
EMPTY 10x12	The 10x12 inch film supply magazine is empty.	10x12 film supply empty.	<None>/interact
EMPTY 10x12 BLUE	The 10x12 inch blue film supply magazine is empty.	10x12 blue film supply empty.	<None>/interact
EMPTY 10x12 CLR	The 10x12 inch clear film supply magazine is empty.	10x12 clear film supply empty.	<None>/interact
EMPTY 10x12 PAPR	The 10x12 inch paper supply magazine is empty.	10x12 paper supply empty.	<None>/interact
EMPTY 10x14	The 10x14 inch film supply magazine is empty.	10x14 film supply empty.	<None>/interact
EMPTY 10x14 BLUE	The 10x14 inch blue film supply magazine is empty.	10x14 blue film supply empty.	<None>/interact
EMPTY 10x14 CLR	The 10x14 inch clear film supply magazine is empty.	10x14 clear film supply empty.	<None>/interact
EMPTY 10x14 PAPR	The 10x14 inch paper supply magazine is empty.	10x14 paper supply empty.	<None>/interact
EMPTY 11x14	The 11x14 inch film supply magazine is empty.	11x14 film supply empty.	<None>/interact
EMPTY 11x14 BLUE	The 11x14 inch blue film supply magazine is empty.	11x14 blue film supply empty.	<None>/interact
EMPTY 11x14 CLR	The 11x14 inch clear film supply magazine is empty.	11x14 clear film supply empty.	<None>/interact
EMPTY 11x14 PAPR	The 11x14 inch paper supply magazine is empty.	11x14 paper supply empty.	<None>/interact
EMPTY 14x14	The 14x14 inch film supply magazine is empty.	14x14 film supply empty.	<None>/interact
EMPTY 14x14 BLUE	The 14x14 inch blue film supply magazine is empty.	14x14 blue film supply empty.	<None>/interact
EMPTY 14x14 CLR	The 14x14 inch clear film supply magazine is empty.	14x14 clear film supply empty.	<None>/interact

Printer Status info/Execution Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
EMPTY 14x14 PAPR	The 14x14 inch paper supply magazine is empty.	14x14 paper supply empty.	<None>/interact
EMPTY 14x17	The 14x17 inch film supply magazine is empty.	14x17 film supply empty.	<None>/interact
EMPTY 14x17 BLUE	The 14x17 inch blue film supply magazine is empty.	14x17 blue film supply empty.	<None>/interact
EMPTY 14x17 CLR	The 14x17 inch clear film supply magazine is empty.	14x17 clear film supply empty.	<None>/interact
EMPTY 14x17 PAPR	The 14x17 inch paper supply magazine is empty.	14x17 paper supply empty.	<None>/interact
EMPTY 24x24	The 24x24 inch film supply magazine is empty.	24x24 film supply empty.	<None>/interact
EMPTY 24x24 BLUE	The 24x24 inch blue film supply magazine is empty.	24x24 blue film supply empty.	<None>/interact
EMPTY 24x24 CLR	The 24x24 inch clear film supply magazine is empty.	24x24 clear film supply empty.	<None>/interact
EMPTY 24x24 PAPR	The 24x24 inch paper supply magazine is empty.	24x24 paper supply empty.	<None>/interact
EMPTY 24x30	The 24x30 inch film supply magazine is empty.	24x30 film supply empty.	<None>/interact
EMPTY 24x30 BLUE	The 24x30 inch blue film supply magazine is empty.	24x30 blue film supply empty.	<None>/interact
EMPTY 24x30 CLR	The 24x30 inch clear film supply magazine is empty.	24x30 clear film supply empty.	<None>/interact
EMPTY 24x30 PAPR	The 24x30 inch paper supply magazine is empty.	24x30 paper supply empty.	<None>/interact
EMPTY A4 PAPR	The A4 paper supply magazine is empty.	A4 paper supply empty.	<None>/interact
EMPTY A4 TRANS	The A4 transparency supply magazine is empty.	A4 transparency supply empty.	<None>/interact
EXPOSURE FAILURE	The exposure device has failed due to some unspecified reason.	Exposure device has failed.	<None>/interact
FILM JAM	A film transport error has occurred and a film is jammed in the printer or processor.	Film jam.	<None>/interact
FILM TRANSP ERR	There is a malfunction with the film transport, there may or may not be a film jam.	Film transport problem.	<None>/interact
FINISHER EMPTY	The finisher is empty.	Finisher is empty.	<None>/interact
FINISHER ERROR	The finisher is not operating due to some unspecified reason.	Finisher problem.	<None>/interact

Printer Status info/Execution Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
FINISHER LOW	The finisher is low on supplies	Finisher low.	<None>/interact
LOW 8x10	The 8x10 inch film supply magazine is low.	8x10 film supply low.	<None>/interact
LOW 8x10 BLUE	The 8x10 inch blue film supply magazine is low.	8x10 blue film supply low.	<None>/interact
LOW 8x10 CLR	The 8x10 inch clear film supply magazine is low.	8x10 clear film supply low.	<None>/interact
LOW 8x10 PAPR	The 8x10 inch paper supply magazine is low.	8x10 paper supply low.	<None>/interact
LOW 10x12	The 10x12 inch film supply magazine is low.	10x12 film supply low.	<None>/interact
LOW 10x12 BLUE	The 10x12 inch blue film supply magazine is low.	10x12 blue film supply low.	<None>/interact
LOW 10x12 CLR	The 10x12 inch clear film supply magazine is low.	10x12 clear film supply low.	<None>/interact
LOW 10x12 PAPR	The 10x12 inch paper supply magazine is low.	10x12 paper supply low.	<None>/interact
LOW 10x14	The 10x14 inch film supply magazine is low.	10x14 film supply low.	<None>/interact
LOW 10x14 BLUE	The 10x14 inch blue film supply magazine is low.	10x14 blue film supply low.	<None>/interact
LOW 10x14 CLR	The 10x14 inch clear film supply magazine is low.	10x14 clear film supply low.	<None>/interact
LOW 10x14 PAPR	The 10x14 inch paper supply magazine is low.	10x14 paper supply low.	<None>/interact
LOW 11x14	The 11x14 inch film supply magazine is low.	11x14 film supply low.	<None>/interact
LOW 11x14 BLUE	The 11x14 inch blue film supply magazine is low.	11x14 blue film supply low.	<None>/interact
LOW 11x14 CLR	The 11x14 inch clear film supply magazine is low.	11x14 clear film supply low.	<None>/interact
LOW 11x14 PAPR	The 11x14 inch paper supply magazine is low.	11x14 paper supply low.	<None>/interact
LOW 14x14	The 14x14 inch film supply magazine is low.	14x14 film supply low.	<None>/interact
LOW 14x14 BLUE	The 14x14 inch blue film supply magazine is low.	14x14 blue film supply low.	<None>/interact
LOW 14x14 CLR	The 14x14 inch clear film supply magazine is low.	14x14 clear film supply low.	<None>/interact
LOW 14x14 PAPR	The 14x14 inch paper supply magazine is low.	14x14 paper supply low.	<None>/interact

Printer Status info/Execution Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
LOW 14x17	The 14x17 inch film supply magazine is low.	14x17 film supply low.	<None>/interact
LOW 14x17 BLUE	The 14x17 inch blue film supply magazine is low.	14x17 blue film supply low.	<None>/interact
LOW 14x17 CLR	The 14x17 inch clear film supply magazine is low.	14x17 clear film supply low.	<None>/interact
LOW 14x17 PAPR	The 14x17 inch paper supply magazine is low.	14x17 paper supply low.	<None>/interact
LOW 24x24	The 24x24 inch film supply magazine is low.	24x24 film supply low.	<None>/interact
LOW 24x24 BLUE	The 24x24 inch blue film supply magazine is low.	24x24 blue film supply low.	<None>/interact
LOW 24x24 CLR	The 24x24 inch clear film supply magazine is low.	24x24 clear film supply low.	<None>/interact
LOW 24x24 PAPR	The 24x24 inch paper supply magazine is low.	24x24 paper supply low.	<None>/interact
LOW 24x30	The 24x30 inch film supply magazine is low.	24x30 film supply low.	<None>/interact
LOW 24x30 BLUE	The 24x30 inch blue film supply magazine is low.	24x30 blue film supply low.	<None>/interact
LOW 24x30 CLR	The 24x30 inch clear film supply magazine is low.	24x30 clear film supply low.	<None>/interact
LOW 24x30 PAPR	The 24x30 inch paper supply magazine is low.	24x30 paper supply low.	<None>/interact
LOW A4 PAPR	The A4 paper supply magazine is low.	A4 paper supply low.	<None>/interact
LOW A4 TRANS	The A4 transparency supply magazine is low.	A4 transparency supply low.	<None>/interact
NO RECEIVE MGZ	The film receive magazine no available.	Film receiver not available.	<None>/interact
NO RIBBON	The ribbon cartridge needs to be replaced.	Replace ribbon cartridge.	<None>/interact
NO SUPPLY MGZ	The film supply magazine specified for this job is not available.	Film supply not available.	<None>/interact
CHECK PRINTER	The printer is not ready at this time, operator intervention is required to make the printer available.	Check camera.	<None>/interact
CHECK PROC	The processor is not ready at this time, operator intervention is required to make the printer available.	Check processor.	<None>/interact
PRINTER DOWN	The printer is not operating due to some unspecified reason.	Camera down.	<None>/interact

Printer Status info/Execution Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
PRINTER INIT	The printer is not ready at this time, it is expected to become available without intervention, For example, it may be in a normal warm-up state.	Camera initializing.	<None>/idle
PRINTER OFFLINE	The printer has been disabled by an operator or service person.	Camera off-line.	<None>/interact
PROC DOWN	The processor is not operating due to some unspecified reason.	Processor down.	<None>/interact
PROC INIT	The processor is not ready at this time, it is expected to become available without intervention. For example, it may be in a normal warm-up state.	Processor initializing.	<None>/idle
PROC OVERFLOW FL	Processor chemicals are approaching the overflow full mark.	Processor chemicals overflow.	<None>/interact
PROC OVERFLOW HI	Processor chemicals have reached the overflow full mark.	Processor chemicals near overflow.	<None>/interact
QUEUED	Print job in Queue	-	<None>/idle
RECEIVER FULL	The Film receive magazine is full.	Receiver full.	<None>/interact
REQ MED NOT INST	The requested film, paper, or other media supply magazine is installed in the printer, but may be available with operator intervention.	Install media supply.	<None>/interact
REQ MED NOT AVAI	The requested film, paper, or other media requested is not available on this printer.	Media supply not available on this camera. Queue stopped. Change camera.	Queue for this camera will be STOPPED/queue stopped
RIBBON ERROR	There is an unspecified problem with the print ribbon.	Error with print ribbon.	<None>/interact
SUPPLY EMPTY	The printer is out of film.	Camera out of film.	<None>/interact
SUPPLY LOW	The film supply is low.	Film supply low.	<None>/interact
UNKNOWN	There is an unspecified problem.	Unspecified problem with camera.	<None>/interact

Table 47: *Printer Status Infos: Additional Agfa printer status infos*

Printer Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
WARMING UP	Printer is in the warm-up stage. Spooling of print jobs to disk is still possible.	Camera is warming up.	<None>idle
OFFLINE	Printer is switched off-line. Spooling of print jobs to disk is still possible.	Camera is switched off-line.	<None>/interact
NONE	General printer warning, no specific information is available. Spooling of print jobs to disk is still possible.	-	<None>/idle
-	-	-	-

Table 48: Printer Status Infos: Additional Kodak infos for Pacs Link (formerly Imation cameras)

Printer Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
SUPPLY MGZ ERR	The supply magazine has an error.	Film supply has an error.	<None>/interact
-	-	-	-

Table 49: Printer Status Infos: Additional Kodak infos for Kodak 190

Printer Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
PRINTER STOPPED	The printer has stopped	Camera has stopped.	<None>/interact
FATAL ERROR	Fatal error.	Fatal error. Queue stopped.	Queue for this camera will be STOPPED/queue stopped
-	-	-	-

Table 50: Printer Status Infos: Additional Kodak infos for 2180/1120

Printer Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
PRINTER NOT RDY	Printer not ready.	Camera not ready.	<None>/interact
CHECK PROCESSOR	Check processor.	Check processor.	<None>/interact
NO TONER	No toner.	No toner.	<None>/interact
FATAL	Fatal error.	Fatal error. Queue stopped.	Queue for this camera will be STOPPED/queue stopped

Printer Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
-	-	-	-

Table 51: Printer Status Infos: Additional Codonics infos

Printer Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
STANDARD	Printer is ready.	Camera is ready.	<None>/Normal
LOAD A-SIZE	Load A-size media.	Load A-size media.	<None>/interact
LOAD A-DVPAPER	Load A-size black and white paper.	Load A-size black and white paper.	<None>/interact
LOAD A-CVPAPER	Load A-size color paper.	Load A-size color paper.	<None>/interact
LOAD A-CVTRANS	Load A-size transparencies.	Load A-size transparencies.	<None>/interact
LOAD A4-SIZE	Load A4-size media.	Load A4-size media.	<None>/interact
LOAD A4-DVPAPER	Load A4-size black and white paper.	Load A4-size black and white paper.	<None>/interact
LOAD A4-CVPAPER	Load A4-size color paper.	Load A4-size color paper.	<None>/interact
LOAD A4-CVTRANS	Load A4-size transparencies.	Load A4-size transparencies.	<None>/interact
LOAD LA-SIZE	Load LA-size media.	Load LA-size media.	<None>/interact
LOAD LA-DVPAPER	Load LA-size black and white paper.	Load LA-size black and white paper.	<None>/interact
LOAD LA-CVPAPER	Load LA-size color paper.	Load LA-size color paper.	<None>/interact
LOAD LA-CVTRANS	Load LA-size transparencies.	Load LA-size transparencies.	<None>/interact
LOAD LA4-SIZE	Load LA4-size media.	Load LA4-size media.	<None>/interact
LOAD LA4-DVPAPER	Load LA4-size black and white paper.	Load LA4-size black and white paper.	<None>/interact
LOAD LA4-CVPAPER	Load LA4-size color paper.	Load LA4-size color paper.	<None>/interact
LOAD LA4-CVTRANS	Load LA4-size transparencies.	Load LA4-size transparencies.	<None>/interact
LOAD XLA-SIZE	Load XLA-size media.	Load XLA-size media.	<None>/interact
LOAD XLA-DVPAPER	Load XLA-size black and white paper.	Load XLA-size black and white paper.	<None>/interact
LOAD XLA-CVPAPER	Load XLA-size color paper.	Load XLA-size color paper.	<None>/interact

Printer Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
LOAD XLA-CVTRANS	Load XLA-size transparencies.	Load XLA-size transparencies.	<None>/interact
LOAD XLA4-SIZE	Load XLA4-size media.	Load XLA4-size media.	<None>/interact
LOAD XLA4-DVPAPE	Load XLA4-size black and white paper.	Load XLA4-size black and white paper.	<None>/interact
LOAD XLA4-CVPAPE	Load XLA4-size color paper.	Load XLA4-size color paper.	<None>/interact
LOAD XLA4-CVTRAN	Load XLA4-size transparencies.	Load XLA4-size transparencies.	<None>/interact
LOAD XLW-SIZE	Load XLW-size media.	Load XLW-size media.	<None>/interact
LOAD XLW-DVPAPER	Load XLW-size black and white paper.	Load XLW-size black and white paper.	<None>/interact
LOAD XLW-CVPAPER	Load XLW-size color paper.	Load XLW-size color paper.	<None>/interact
LOAD 8X10-SIZE	Load 8x10 media.	Load 8x10 media.	<None>/interact
LOAD 8X10-DVFILM	Load 8x10 black and white film.	Load 8x10 black and white film.	<None>/interact
SUPPLY MISSING	The film supply magazine specified for this job is not available.	Film supply not available.	<None>/interact
RIBBON MISSING	Ribbon is missing.	Ribbon is missing.	<None>/interact
RIBBON EMPTY	Ribbon is empty.	Ribbon is empty.	<None>/interact
TOP COVER OPEN	Top cover of printer is open.	Top cover of camera is open.	<None>/interact
-	-	-	-

Table 52: Additional DICOM Execution Status Infos

Execution Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
INVALID PAGE DES	The specified page layout cannot be printed or other page description errors have been detected.	Film Job cannot be printed on this camera. Queue stopped. Please redirect film job.	Queue for this camera will be STOPPED/queue stopped
INSUFFIC MEMORY	There is not enough memory available to complete this job.	Not enough memory available in camera. Queue stopped. Please continue queue or change camera.	Queue for this camera will be STOPPED/queue stopped
NONE	General printer warning, no specific information is available. Spooling of print jobs to disk is still possible.	-	<None>/idle

Execution Status info	Description	Message string visible in the Status Bar	Other action for Iso C 3D /camera symbol
-	-	-	-

3.6 Modality Worklist AE Specification

The Modality worklist SCU requests that the remote SCP performs a match of all keys specified in the query against the information in its worklist database.

Iso C 3D DICOM products provide Standard Conformance to DICOM. The worklist attributes are available at the 3 D component database (scheduler). An automatic registration with the full data set of the patient is not possible. The registration of a patient is done manually on the 2D component.

V3.0 SOP Class as an SCU:

Table 33: SOP Classes as an SCU

SOP Class Name	SOP Class UID
Modality Worklist Information Model - FIND	1.2.840.10008.5.1.4.31

3.6.1 Association Establishment Policies

3.6.1.1 General

The configuration of the Iso C 3D DICOM modality worklist application defines the Application Entity Titles, the port numbers and of course the host name and net address.

3.6.1.2 Number of Associations

The Iso C 3D DICOM application initiates one/several association(s) at a time, one for each transfer request being processed.

3.6.1.3 Asynchronous Nature

The Iso C 3D DICOM software does not support asynchronous communication (multiple out-standing transactions over a single association).

3.6.1.4 Implementation Identifying Information

The Iso C 3D DICOM software provides a single Implementation Class UID of

1.3.12.2.1107.5.12.6"

and an Implementation Version Name of

• “VB10H_VB00B”.

3.6.2 Association Initiation Policy

The Modality Worklist SCU establishes an association by using the DICOM association services.

The following DIMSE-C operation is supported as SCU:

- C-FIND

3.6.2.1 Real World Activity

3.6.2.1.1 Associated Real-World Activity

The associated Real-World activity is to initiate query requests to an SCP by using the DICOM Worklist Information Model.

3.6.2.1.2 Proposed Presentation Contexts

The Iso C 3D DICOM application will propose Presentation Contexts as shown in the following table:

Table 54: *Proposed presentation contexts*

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended
Name	UID	Name List	UID List		Negotia-tion
Modality Worklist In-formation Model-FIND	1.2.840.10008.5.1.4.31	DICOM Implicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2	SCU	None
		DICOM Explicit VR Little Endian Transfer Syntax	1.2.840.10008.1.2.1		
		DICOM Explicit VR Big Endian Transfer Syntax	1.2.840.10008.1.2.2		

3.6.2.1.3 SOP Specific Conformance Statement

Search Key Attributes of the Worklist C-FIND

The Iso C 3D DICOM worklist SCU supports worklist queries with all required search keys and several optional search keys.

The following table describes the search keys that the SCU supports for a broad worklist query, which is a query for all tasks scheduled for the own modality or own modality application entity, defined with the following search keys:

Table 55: Search Key Attributes in a broad worklist query

Attribute name	Tag	Matching Key Type	query value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Scheduled Station AE Title	(0040,0001)	R	Configurable1: own AET or "*"
>Scheduled Procedure Step Start Date	(0040,0002)	R	Configurable: inserted in UI2 or today
>Scheduled Procedure Step Start Time	(0040,0003)	R	Configurable: inserted in UI[3] or zero length
>Modality	(0008,0060)	R	Configurablea: own modality or "*"

One and only one of the attributes "Modality" and "AE Title" is set to "*". There is a configuration parameter telling which of them. The otherone is always set to the "own" value (i.e. own modality respectively own AE Title).

2<startDate>-<endDate>

3<startTime>-<endTime>

The following table describes the search keys that the SCU supports for a patient based worklist query, which is defined by the following search keys:

Table 56: *Search Key Attributes in a patient based worklist query*

Attribute name	Tag	Matching Key Type	query value
Scheduled Procedure Step			
Scheduled Procedure Step Sequence	(0040,0100)	R	
>Scheduled Performing Physician's Name	(0040,0006)	R	inserted in UI or zero length
Requested Procedure			
Requested Procedure ID	(0040,1001)	O	inserted in UI or zero length
Imaging Service Request			
Accession Number	(0008,0050)	O	inserted in UI or zero length
Referring Physician's Name	(0008,0090)	O	inserted in UI or zero length
Visit Status			
Current Patient Location	(0038,0300)	O	inserted in UI or zero length
Patient Identification			
Patient's Name	(0010,0010)	R	inserted in UI or zero length
Patient ID	(0010,0020)	R	inserted in UI or zero length

Return Key Attributes used from the Worklist C_FIND_RSP

The Iso C 3D DICOM worklist SCU supports worklist queries with return key attributes of all types. The following table describes the return keys that the SCU supports. Most attributes can be shown in the User Interface (PatientRegistration or PatientBrowser), but in PatientBrowser it is configurable which of them are shown really.

Table 57: Modality Worklist C_FIND_RSP Return Key Attributes

Attribute name	Tag	Return Key Type	displayed in User Interface
SOP Common			
Specific Character Set	(0008,0005)	1C	-
Scheduled Procedure Step			

Attribute name	Tag	Return Key Type	displayed in User Interface
Scheduled Procedure Step Sequence	(0040,0100)	1	-
>Scheduled Station AE Title	(0040,0001)	1	yes
>Scheduled Procedure Step Start Date	(0040,0002)	1	yes
>Scheduled Procedure Step Start Time	(0040,0003)	1	yes
>Scheduled Procedure Step End Date	(0040,0004)	3	-
>Scheduled Procedure Step End Time	(0040,0005)	3	-
>Modality	(0008,0060)	1	yes
>Scheduled Performing Physician's Name	(0040,0006)	1	yes
>Scheduled Procedure Step Description	(0040,0007)	1C	yes
>Scheduled Station Name	(0040,0010)	2	yes
>Scheduled Procedure Step Location	(0040,0011)	2	yes
>Scheduled Action Item Code Sequence	(0040,0008)	1C	-
>>Code Value	(0008,0100)	1C	yes
>>Coding Scheme Designator	(0008,0102)	1C	yes
>>Coding Scheme Version	(0008,0102)	3	yes
>>Code Meaning	(0008,0104)	3	yes
>Pre-Medication	(0040,0012)	2C	yes
>Scheduled Procedure Step ID	(0040,0009)	1	yes
>Requested Contrast Agent	(0032,1070)	2C	yes
>Scheduled Procedure Step Status	(0040,0020)	3	yes
>Comments on the Scheduled Procedure Step	(0040,0400)	3	-
Requested Procedure			
Requested Procedure ID	(0040,1001)	1	yes
Requested Procedure Description	(0032,1060)	1C	yes
Requested Procedure Code Sequence	(0032,1064)	1C	-
>Code Value	(0008,0100)	1C	yes
>Code Scheme Designator	(0008,0102)	1C	yes
>Code Scheme Version	(0008,0103)	3	yes
>Code Meaning	(0008,0104)	3	yes
Study Instance UID	(0020,000D)	1	-
Referenced Study Sequence	(0008,1110)	2	-
>Referenced SOP Class UID	(0008,1150)	1C	-
>Referenced SOP Instance UID	(0008,1155)	1C	-
Requested Procedure Priority	(0040,1003)	2	yes
Patient Transport Arrangements	(0040,1004)	2	-
Reason for the Requested Procedure	(0040,1002)	3	-
Confidentiality Code	(0040,1008)	3	-
Reporting Priority	(0040,1009)	3	-
Names of Intended Recipients of results	(0040,1010)	3	-
Requested Procedure Comments	(0040,1400)	3	yes
Requested Procedure Location	(0040,1005)	3	-
Imaging Service Request			
Accession Number	(0008,0050)	2	yes

Attribute name	Tag	Return Key Type	displayed in User Interface
Requesting Physician	(0032,1032)	2	yes
Referring Physician's Name	(0008,0090)	2	yes
Reason for the Imaging Service Request	(0040,2001)	3	-
Imaging Service Request Comments	(0040,2400)	3	yes
Requesting Service	(0032,1033)	3	yes
Issuing Date of Imaging Service Request	(0040,2004)	3	-
Issuing Time of Imaging Service Request	(0040,2005)	3	-
Placer Order Number / Imaging Service Request	(0040,2016)	3	-
Filler Order Number / Imaging Service Request	(0040,2017)	3	-
Order entered by...	(0040,2008)	3	-
Order Enterer's Location	(0040,2009)	3	-
Order Callback Phone Number	(0040,2010)	3	-
Visit Identification			
Admission ID	(0038,0010)	2	yes
Issuer of Admission ID	(0038,0011)	3	-
Visit Status			
Current Patient Location	(0038,0300)	2	yes
Visit Relationship			
Referenced Patient Sequence	(0008,1120)	2	-
>Referenced SOP Class UID	(0008,1150)	2	-
>Referenced SOP Instance UID	(0008,1155)	2	-
Visit Admission			
Institution Name	(0008,0000)	3	yes
Admitting Diagnoses Description	(0008,1080)	3	yes
Patient Identification			
Patient's Name	(0010,0010)	1	yes
Patient ID	(0010,0020)	1	yes
Patient Demographic			
Patients Birth Date	(0010,0030)	2	yes
Patient's Sex	(0010,0040)	2	yes
Patient's Size	(0010,1020)	3	yes
Patient's Weight	(0010,1030)	2	yes
Confidentiality constraint on patient data	(0040,3001)	2	yes
Patient's Address	(0010,1040)	3	yes
Military Rank	(0010,1080)	3	yes
Ethnic Group	(0010,2160)	3	yes
Patient Comments	(0010,4000)	3	yes
Patient Medical			
Patient State	(0038,0500)	2	yes
Pregnancy Status	(0010,21C0)	2	yes
Medical Alerts	(0010,2000)	2	yes
Contrast Allergies	(0010,2110)	2	yes
Special Needs	(0038,0050)	2	yes
Smoking Status	(0010,21A0)	3	yes

Attribute name	Tag	Return Key Type	displayed in User Interface
Last Menstrual Date	(0010,21D0)	3	yes
Additional Patient History	(0010,21B0)	3	yes

Status Codes of the Worklist C-FIND

The worklist SCU interprets following status codes:

Table 58: C-FIND Response Status

Service Status	Meaning	Status Codes (0000,0900)
Refused	Out of Resources	A700
	SOP class not supported	0122
Failed	Identifier does not match SOP Class	A900
	Unable to process	C001
Cancel	Matching terminated due to Cancel request	FE00
Success	Matching is complete - No final Identifier is supplied	0000
Pending	Matches are continuing - Current Match is supplied and any Optional Keys were supported in the same manner as Required Keys	FF00
	Matches are continuing - Warning that one or more Optional Keys were not supported for existence and/or matching for this identifier	FF01

4 Communication Profiles

4.1 Supported Communication Stacks

The Iso C 3D DICOM application provide DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard.

4.1.1 OSI Stack

not supported.

4.1.2 TCP/IP Stack

The Iso C 3D DICOM application uses the TCP/IP stack from the Windows NT system. It uses the MergeCOM-3 subroutine library from Merge Technologies Inc. that is based on a TCP/IP socket interface.

4.1.2.1 API

The Iso C 3D DICOM application uses the MergeCOM library.

4.1.2.2 Physical Media Support

The Iso C 3D DICOM application is indifferent to the physical medium over which TCP/IP executes.

4.1.3 Point-to-Point Stack

not supported.

5 Extensions/Specializations/Privatizations

5.1 Standard Extended/Specialized/Private SOPs

5.1.1 Standard Extensions of all SOP Classes

The following tables list the data dictionary of all DICOM IOD attributes where the DICOM standard definitions are extended:

Table 65: Standard Extensions of all SOP Classes

Attribute Name	Tag	Private Creator	Type	Notes
Image Type	(0008,0008)	-	1	see 5.1.1.1 additional Defined Terms: Defined Terms for value 3: OTHER Defined Terms for value 4: CSA 3D EDITOR CSA 3D FLY PATH CSA 3D FLY VRT CSA 3D FUSION CSA AVERAGE CSA BLACK IMAGE CSA RESAMPLED CSA MIP CSA MPR CSA MPR CURVED CSA MPR THICK CSA SSD CSA SUBTRACT CT_SOM4 * ECAT ACF ECAT NORMAL ECAT 3D SINO ECAT 3D SINO FLT SHS *

Attribute Name	Tag	Private Creator	Type	Notes
Patient Position	(0018,5100)	-	2C	see 5.1.1.2 additional Defined Terms for the Magnetom Open: HLS HLP FLS FLP HLDL HLDR FLDL FLDR

All SOP classes may contain additional type 3 attributes which DICOM standard defines in a different DICOM IOD or DICOM SOP class (attributes from Normalized SOP classes).

This is the case for example for

- Rescale Slope (0028,1053)
- Rescale Intercept (0028,1052)

which are also used in the MR IOD.

5.1.1.1 Image Type

The Image Type (0008,0008) attribute identifies important image identification characteristics. These characteristics are:

1. Pixel Data Characteristics:

- is the image an ORIGINAL Image; an image whose pixel values are based on original or source data, or
- is the image a DERIVED Image; an image whose pixel values have been derived in some manner from the pixel value of one or more other images.

2. Patient Examination Characteristics:

- is the image a PRIMARY Image; an image created as a direct result of the Patient examination, or is the image a SECONDARY Image; an image created after the initial Patient examination.

3. Modality Specific Characteristics (SOP Specific Characteristics).
4. Implementation specific identifiers; other implementation specific identifiers shall be documented in an implementation's conformance claim.

The Image Type attribute is multivalued and shall be provided in the following manner:

- Value 1 shall identify the Pixel Data Characteristics; Enumerated Values for the Pixel Data Characteristics are:

- ORIGINAL = identifies an Original Image
- DERIVED = identifies a Derived Image

- Value 2 shall identify the Patient Examination Characteristics; Enumerated Values for the Patient Examination Characteristics are:
  - PRIMARY = identifies a Primary Image
  - SECONDARY = identifies a Secondary Image
- Value 3 shall identify any Image IOD specific specialization, the following terms are defined in addition to the DICOM standard definitions:
  - OTHER = is also used for converted non-Axial and non-Localizer CT images
  - MPR = for 3D MPR images
  - PROJECTION IMAGE = for 3D MIP and SSD images

5.1.2 Standard Extensions of XRF SOP Class

5.1.3 Image Type - value 4

n.a

5.1.4 Private Elements for Storage SOP Classes

The following private attributes are defined by Iso C 3D DICOM applications.

5.1.4.1 Registry of DICOM Data Elements

Tag	Private Owner Code	Name	VR	V M
(0029,xx02)				
(0029,xx08)	SIEMENS CSA HEADER	CSA Image Header Type	CS	1
(0029,xx09)	SIEMENS CSA HEADER	CSA Image Header Version	LO	1
(0029,xx10)	SIEMENS CSA HEADER	CSA Image Header Info	OB	1
(0029,xx18)	SIEMENS CSA HEADER	CSA Series Header Type	CS	1

(0029,xx19)	SIEMENS CSA HEADER	CSA Series Header Version	LO	1
(0029,xx20)	SIEMENS CSA HEADER	CSA Series Header Info	OB	1
(0029,xx08)	SIEMENS CSA NON-IMAGE	CSA Data Type	CS	1
(0029,xx09)	SIEMENS CSA NON-IMAGE	CSA Data Version	LO	1
(0029,xx10)	SIEMENS CSA NON-IMAGE	CSA Data Info	OB	1
(0029,xx08)	SIEMENS MEDCOM HEADER	MedCom Header Type	CS	1
(0029,xx09)	SIEMENS MEDCOM HEADER	MedCom Header Version	LO	1
(0029,xx10)	SIEMENS MEDCOM HEADER	MedCom Header Info	OB	1
(0029,xx20)	SIEMENS MEDCOM HEADER	MedCom History Information	OB	1
(0029,xx31)	SIEMENS MEDCOM HEADER	PMTF Information 1	LO	1
(0029,xx32)	SIEMENS MEDCOM HEADER	PMTF Information 2	UL	1
(0029,xx33)	SIEMENS MEDCOM HEADER	PMTF Information 3	UL	1
(0029,xx34)	SIEMENS MEDCOM HEADER	PMTF Information 4	CS	1
(0029,xx35)	SIEMENS MEDCOM HEADER	PMTF Information 5	UL	1
(0029,xx40)	SIEMENS MEDCOM HEADER	Application Header Sequence	SQ	1
(0029,xx41)	SIEMENS MEDCOM HEADER	Application Header Type	CS	1
(0029,xx42)	SIEMENS MEDCOM HEADER	Application Header ID	LO	1
(0029,xx43)	SIEMENS MEDCOM HEADER	Application Header Version	LO	1
(0029,xx44)	SIEMENS MEDCOM HEADER	Application Header Info	OB	1
(0029,xx50)	SIEMENS MEDCOM HEADER	Workflow Control Flags	LO	8
(0029,xx51)	SIEMENS MEDCOM HEADER	Archive Management Flag Keep Online	CS	1

(0029,xx52)	SIEMENS MEDCOM HEADER	Archive Management Flag Do Not Archive	CS	1
(0029,xx53)	SIEMENS MEDCOM HEADER	Image Location Status	CS	1
(0029,xx54)	SIEMENS MEDCOM HEADER	Estimated Retrieve Time	DS	1
(0029,xx55)	SIEMENS MEDCOM HEADER	Data Size of Retrieved Images	DS	1
(0029,xx08)	SIEMENS MEDCOM OOG	MEDCOM OOG Type	CS	1
(0029,xx09)	SIEMENS MEDCOM OOG	MEDCOM OOG Version	LO	1
(0029,xx10)	SIEMENS MEDCOM OOG	MEDCOM OOG Info	OB	1

Tag	Private Owner Code	Name	VR	VM
(7FE1,xx10)	SIEMENS CSA NON-IMAGE	CSA Data	OB	1

The next subsections will explain in which IODs these private data elements are used.

5.1.4.2 All Iso C 3D Supported Image SOP Classes

extended Image IOD Module Table

Table 67: *CSA Image IOD Modules*

IE	Module	Reference	Usage	Note
Patient	Patient	part 3 C.7.1.1	M	
Study	General Study	part 3 C.7.2.1	M	
	Patient Study	part 3 C.7.2.2	U	
Series	General Series	part 3 C.7.3.1	M	
Equipment	General Equipment	part 3 C.7.5.1	U	

Image	General Image	part 3 C.7.6.1	M	
	Image Pixel	part 3 C.7.6.3	M	
	IOD specific modules	part 3 C.8.<module>	M/U	depends on the IOD
	CSA Image Header	5.1.3.2.2	U	private GG information
	CSA Series Header	5.1.3.2.3	U	
	MEDCOM Header	5.1.3.2.4	U	
	MEDCOM OOG	5.1.3.2.5	U	private Iso C 3D information
	SOP Common	part 3 C.12.1	M	if object graphics is attached to image

5.1.4.2.1 CSA Image Header Module

The table in this section contains private IOD Attributes that describe the CSA Image Header.

Table 68: CSA Image Header Module

Attribute Name	Tag	Private Creator	Type	Notes
CSA Image Header Type	(0029,xx08)	SIEMENS CSA HEADER	1	CSA Image Header identification characteristics. Defined Terms: <NUM 4 = NUMARIS/4 > <SOM 5 = SOMARIS/5 >
CSA Image Header Version	(0029,xx09)	SIEMENS CSA HEADER	3	Version of CSA Image Header Info (0029,xx10) format.
CSA Image Header Info	(0029,xx10)	SIEMENS CSA HEADER	3	Product dependent information.

5.1.4.2.2 CSA Series Header Module

The table in this section contains private IOD Attributes that describe the CSA Series Header.

Table 69: CSA Series Header Module

Attribute Name	Tag	Private Creator	Type	Notes
CSA Series Header Type	(0029,xx 18)	SIEMENS CSA HEADER	1	CSA Series Header identification characteristics. Defined Terms: <NUM 4 = NUMARIS/4> <SOM 5 = Somaris/5
CSA Series Header Version	(0029,xx 19)	SIEMENS CSA HEADER	3	Version of CSA Series Header Info (0029,xx20) format.
CSA Series Header Info	(0029,xx 20)	SIEMENS CSA HEADER	3	Product dependent information.

5.1.4.2.3 MEDCOM Header Module

The table in this section contains private IOD Attributes that describe MEDCOM Header.

Table 70: MEDCOM Header Module

Attribute Name	Tag	Private Creator	Type	Notes
MedCom Header Type	(0029,xx 08)	SIEMENS MEDCOM HEADER	1C	MedCom Header identification characteristics. Defined Terms: MEDCOM 1 Required if MedCom Header Info (0029,xx10) present.
MedCom Header Version	(0029,xx 09)	SIEMENS MEDCOM HEADER	2C	Version of MedCom Header Info (0029,xx10) format. Required if MEDCOM Header Info (0029,xx10) present.
MedCom Header Info	(0029,xx 10)	SIEMENS MEDCOM HEADER	3	Manufacturer model dependent information. The value of the attribute MedCom Header Info (0029,xx10) can be build up in each user defined format.
MedCom History Information	(0029,xx 20)	SIEMENS MEDCOM HEADER	3	MedCom defined Patient Registration history information. See 5.1.3.2.4.1.

Attribute Name	Tag	Private Creator	Type	Notes
PMTF Information 1	(0029,xx31)	SIEMENS MEDCOM HEADER	3	Transformation Information
PMTF Information 2	(0029,xx32)	SIEMENS MEDCOM HEADER	3	Transformation Information
PMTF Information 3	(0029,xx33)	SIEMENS MEDCOM HEADER	3	Transformation Information
PMTF Information 4	(0029,xx34)	SIEMENS MEDCOM HEADER	3	Transformation Information
Application Header Sequence	(0029,xx40)	SIEMENS MEDCOM HEADER	3	Sequence of Application Header Items. Zero or more Items shall be included in this sequence. Encoded as a sequence of items.
>Application Header Type	(0029,xx41)	SIEMENS MEDCOM HEADER	1C	Application Header identification characteristics. Required if Sequence is sent.
>Application Header ID	(0029,xx42)	SIEMENS MEDCOM HEADER	3	Identification of an application header.
>Application Header Version	(0029,xx43)	SIEMENS MEDCOM HEADER	3	Version of Application Header Info (0029,xx43) format.
>Application Header Info	(0029,xx44)	SIEMENS MEDCOM HEADER	3	Application dependent information.
Workflow Control Flags	(0029,xx50)	SIEMENS MEDCOM HEADER	3	Eight free definable flags.
Archive Management Flag Keep Online	(0029,xx51)	SIEMENS MEDCOM HEADER	3	Flag to control remote archive management system to keep the image always online (also when already archived). Enumerated Values: 00 = remote control not required, 01 = keep image online.

Attribute Name	Tag	Private Creator	Type	Notes
Archive Management Flag Do Not Archive	(0029,xx52)	SIEMENS MEDCOM HEADER	3	Flag to control remote archive management system not to archive the related image. Enumerated Values: 00 = remote control not required, 01 = don't archive image.
Image Location Status	(0029,xx53)	SIEMENS MEDCOM HEADER	3	Image location status to control retrieving. Defined Terms: ONLINE = retrieving has to be done as usual, NEARLINE = move request to SCP and delay according to value of Estimated Retrieve Time (0029,xx54), OFFLINE = invoking a retrieve operation initiates an operator request, INVALID = invoking a retrieve operation would always result in an error.
Estimated Retrieve Time	(0029,xx54)	SIEMENS MEDCOM HEADER	3	Estimated retrieve time in seconds. A value less then zero (< 0) indicates location is OFFLINE or INVALID.
Data Size of Retrieved Images	(0029,xx55)	SIEMENS MEDCOM HEADER	3	Data size of images in MByte.

5.1.4.2.3.1 MEDCOM History Information

The value of the attribute MEDCOM History Information (0029,xx20) is defined in the following way:

Table 71: MEDCOM History Information

Part	Name	Type	Bytes	Notes
header	Identifier	string	32	always "CSA HISTORY"
	Version	string	32	e.g. "V1.10"
> n items	Class Name	string	64	
	Modification String	string	1024	

5.1.4.2.4 MEDCOM OOG Module

The table in this section contains private IOD Attributes that describe MEDCOM Object Oriented Graphics (OOG). This module is used when object graphics is drawn on the image and stores the properties of the graphics objects (Line, Circle, Rectangle, Arrow, and so on). So the graphics objects will remain re-animatable even if such an image is transferred via DICOM C-Store SOP class.

Table 72: MEDCOM OOG Module

Attribute Name	Tag	Private Creator	Type	Notes
MedCom OOG Type	(0029,xx08)	SIEMENS MEDCOM OOG	1	MEDCOM Object Oriented Graphics (OOG) identification characteristics. Defined Terms: MEDCOM OOG 1
MedCom OOG Version	(0029,xx09)	SIEMENS MEDCOM OOG	3	Version of MEDCOM OOG Info (0029,xx10) format.
MedCom OOG Info	(0029,xx10)	SIEMENS MEDCOM OOG	3	MEDCOM Object Oriented Graphics (OOG) data.

5.1.4.2.5 Navigation Matrix

Module	Attribute Name	Tag	Type	Source
Navigation	Filename Navi	(0029,0000)	PN	P.
	IsoC ID	(0029,0001)	PN	P.

Module	Attribute Name	Tag	Type	Source
	Scan ID	(0029,0002)	PN	P
	Calibration ID	(0029,0003)	PN	P
	Navigation Coefficients	(0029,0004)	DB	P
	Filename Siemens	(0029,0005)	PN	P
	ProjectionWish	(0029,0006)	US	P
	ProjectionDone	(0029,0007)	US	P

Table 5-1 Private Attributes for Navigation

The graphics objects are also stored in one Image overlay plane for compatibility with other products which don't support the MedCom OOG module. Any system which does not support this MedCom OOG module has to remove these private attributes when modifying the image overlay data.

6 Media Storage

6.1 Introduction

6.1.1 Purpose

This DICOM Conformance Statement is written according to part PS 3.2 of [1]. The applications described in this conformance statement are the SIEMENS Iso C 3DDICOM off-line media applications. The Iso C 3DDICOM off-line media storage service implemen-tation acts as FSC, FSU and/or FSR for the specified application profiles and the related SOP Class instances.

6.1.2 Scope

This DICOM Conformance Statement refers to SIEMENS <xxx> product. The following table relates software names to SIEMENS Iso C 3D products.

Table 2: Siemens Iso C 3D DICOM Products

Software Name	Siemens Product
Iso C 3D_VB00B	Iso C 3D

6.1.3 Definitions, Abbreviations

6.1.3.1 Definitions

DICOM Digital Imaging and Communications in Medicine

DIMSE DICOM Message Service Element

DIMSE-C DICOM Message Service Element with Composite information objects

6.1.3.2 Abbrevations

ACR American College of Radiology

AE DICOM Application Entity

ASCII American Standard Code for Information Interchange

DB Database

DCS DICOM Conformance Statement

FSC File Set Creator

FSR File Set Reader

FSU File Set Updater

IOD DICOM Information Object Definition

ISO International Standard Organization

R Required Key Attribute

NEMA National Electrical Manufacturers Association

O Optional Key Attribute

PDU DICOM Protocol Data Unit

RWA Real-World Activity

U Unique Key Attribute

6.1.4 References

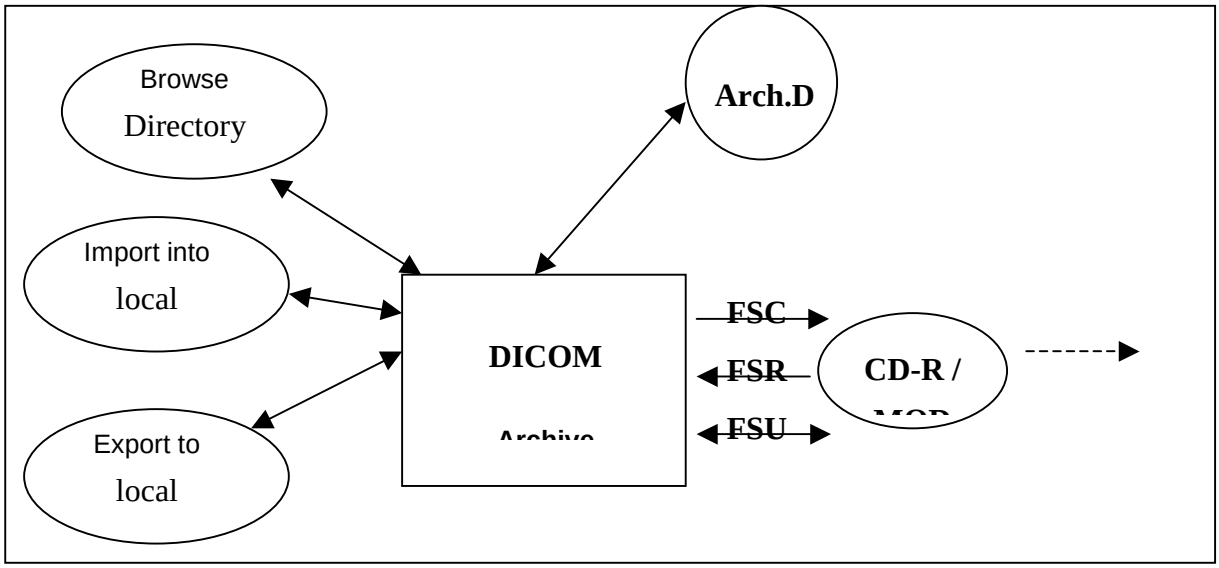
[2] Digital Imaging and Communications in Medicine (DICOM) 3.0, NEMA PS 3.10-12, 1998

6.1.5 Connectivity and Interoperability

The implementation of the Siemens DICOM interface has been carefully tested to assure corre-spondence with this Conformance Statement. But the Conformance Statement and the DICOM standard does not guarantee interoperability of Siemens modalities and modalities of other ven-dors. The user must compare the relevant Conformance Statements and if a successful intercon-nection should be possible, the user is responsible to specify an appropriate test suite and to val-idate the interoperability, which is required. A network environment may need additional func-tions out of the scope of DICOM.

6.2 Implementation Model

6.2.1 Application Data Flow Model



The DICOM archive application will serve as an interface to device. It serves interfaces to include the off-line media directory into the browser and to copy SOP instances to a medium or retrieve SOP Instances from medium into local storage.The DICOM Archive application will support CD-R and MOD media (see Table 81:).The FSU role will update new SOP Instances only to media with pre-existing File-sets conform-ing to the Application Profiles supported.The contents of the DICOMDIR will be temporarily stored in Archive-Database.

6.2.2 Functional Definitions of AEs

The Iso C 3D DICOM offline media storage application consists of the DICOM Archive application entity serving all interfaces to access offline media. The DICOM Archive application is capable of

- creating a new File-set onto an unwritten medium (Export to…).
- updating an existing File-set by writing new SOP Instances onto the medium (Export to...).
- importing SOP Instances from the medium onto local storage

- reading the File-sets DICOMDIR information into temporary database and pass it to display applications.

6.2.3 Sequencing of Real World Activities

The DICOM Archive application will not perform updates before the Directory information of the DICOMDIR is completely read.

6.2.4 File Meta Information Options

The Implementation Class UID is:

1.3.12.2.1107.5.12.6"

and an Implementation Version Name of

• "VB10H_VB00B".

6.3 AE Specification

6.3.1 DICOM Archive Specification

The DICOM Archive provides Standard conformance to Media Storage Service Class (Interchange Option). In addition Augmented conformance is provided to store extra data attributes important for the full feature support of the Iso C 3D product SW. Details are listed in following Table:

Table 3: Application Profiles Supported

Application Profiles Supported	Real-World Activity	Role	SC Option
STD-GEN-CD	Browse Directory Information	FSR	Interchange
STD-CTMR-CD	Import into local Storage	FSR	Interchange
STD-XABC-CD STD-XA1K-CD TD-US-zz-yF-xxxxxx [a] STD-WVFM-GEN-FD	Export to local Archive Media	FSC, FSU	Interchange

a – All combinations of the following values for zz, yF and xxxxxx are suported: ’yF’ can take two values: SF for Single Frame and MF for Multi Frame. ’zz’ can take three values: ID (Image Display), SC(Spatial Calibration) and CC (Combined Calibration) xxxxxx can take 8 values: FLOP and CDR

6.3.1.1 File Meta Information for the Application Entity

The Source Application Entity Title is set by configuration. See Chapter "Configuration" for details.

6.3.1.2 Real-World Activities for this Application Entity

6.3.1.2.1 Real-World Activity: Browse Directory Information

The DICOM Archive application acts as FSR using the interchange option when requested to read the media directory.

The DICOM archive application will read the DICOMDIR and insert those directory entries, that are valid for the application profiles supported, into a local database. The database can the then be used for browsing media contents.

Note

IconImageSQ is also supported in DICOMDIR. But only those Icon Images with BitsAllocated (0028,0100) equal to 8 and size of 64x64 or 128x128 pixels are imported into database and are visible in the Browser.

6.3.1.2.1.1 Application Profiles for the RWA: Browse Directory Information

Table 3**:** Application Profiles Supported: for the Application Profiles listed that invoke this Application Entity for the

Browse Directory Information RWA.

6.3.1.2.2 Real-World Activity: Import into local Storage

The DICOM Archive application acts as FSR using the interchange option when requested to read SOP Instances from the medium into the local storage. The SOP Instance selected from the media directory will be copied into the local storage. Only SOP Instances, that are supported, can be retrieved from media storage.

6.3.1.2.2.1 Application Profiles for the RWA: Import into local Storage

Table 3**:** Application Profiles Supported: for the Application Profiles listed that invoke this

Application Entity for the Copy to Local Storage RWA.

6.3.1.2.3 Real-World Activity: Export to local Archive Media

The DICOM Archive application acts as FSU (for media with existing DICOMfile-set) or FSC

(media not initialized) using the interchange option when requested to copy SOP Instances from the local storage to local Archive medium. The DICOM Archive application will receive a list of SOP Instances to be copied to the local archive medium. According to the state of the medium inserted (new medium, Mediumwith DI-COM file-set) the SOP Instances are either updated or created on the media. Only valid SOP Instances are accepted. The DICOM archive application will not close the CD-R medium.

6.3.1.2.3.1 Application Profiles for the RWA: Export to local Archive Media

Table 3**:** Application Profiles Supported: for the Application Profiles listed that invoke this Application Entity for the Copy to local Archive RWA.

Note:

If the image to be archived also has an IconImage in the database then there will be a IconImageSQ be generated in DICOMDIR file for this image. The IconImageSQ will contain the following attributes:

- SamplesPerPixel (0028,0002) = 1
- Photometric Interpretation (0028,0004) = “MONOCHROME2”
- Rows (0028,0010), Columns (0028,0011)
- = 128,128 for XA IOD images
- = 64,64 for other images
- Bits Allocated (0028,0100) = 8
- Bits Stored (0028,0101) = 8
- High Bit (0028,0102) = 7
- Pixel Representation (0028,0103) = 0 (unsigned int)
- Planar Configuration (0028, 0006) is not set
- Pixel Aspect Ration (0028,0034) is not set (aspect ratio is 1/1)

6.3.1.3 Application profiles

6.3.1.3.1 DICOMDIR keys

The DICOMDIR file will contain the following attributes for the levels Patient - Study - Series- Image/Curve (valid for all Application profiles described in this section):

Table 4: Tags in DICOMDIR file

Attribute	Name	Tag	Type Notes
File-Set identification			
File-set ID	(0004,1130)	2	volume label of media
Directory information			
Record of the Root Directory Entry	(0004,1200)	1	
Offset of the Last Directory Record of the Root Directory Entity	(0004,1202)	1	
File-set Consistency Flag)	(0004,1212	1	0000H
Directory Record Sequence	(0004,1220)	2	
> Offset of the Next Directory Record	(0004,1400)	1C	
> Record In-use flag	(0004,1410)	1C	FFFFH
> Offset of Referenced Lower-Level Directory Entity	(0004,1420)	1C	
> Directory Record Type	(0004,1430)	1C	PATIENT, STUDY, SERIES, IMAGE, CURVE, PRIVATE (see section 11.2.1)
> Referenced File ID	(0004,1500)	1C	contains the filename on media for the Directory Records of Type IMAGE and PRIVATE
> Referenced SOP Class UID in File	(0004,1510)	1C	for the Directory Records of Type IMAGE and PRIVATE
> Referenced SOP Instance UID in File	(0004,1511)	1C	for the Directory Records of Type IMAGE and PRIVATE
> Referenced Transfer Syntax UID in File	(0004,1512)	1C	for the Directory Records of Type IMAGE and PRIVATE
> Record Selection Keys	see below		
Patient Keys			
Specific Character Set	(0008,0005)	1C	see section 7 on page 137
Patient's Name	(0010,0010)	2	
Patient ID	(0010,0020)	1	
Date Of Birth	(0010,0030)	3	Type 2 in STD-XA* profiles
Patient's	Sex (0010,0040)	3	Type 2 in STD-XA* profiles

Study Keys			
Specific Character Set	(0008,0005)	1C	see section 7 on page 137
Study Date	(0008,0020)	1	
Study Time	(0008,0030)	1	
Accession Number)	(0008,0050	2	
Study Description	(0008,1030)	2	
Study Instance UID	(0020,000D)	1C	
Study ID	(0020,0010)	1	Will be generated automatically, if not present. Value = "-"
Series Keys			**Directory Record Type SERIES**
Specific Character Set	(0008,0005)	1C	see section 7 on page 137
Series Date	(0008,0021)	3	
Series Time	(0008,0031)	3	
Modality	(0008,0060)	1	
Institution name	(0008,0080)	3	Type 2 in STD-XA* profiles
Institution Address	(0008,0081)	3	Type 2 in STD-XA* profiles
Series Description	(0008,103E)	3	
Performing Physician	(0008,1050)	3	Type 2 in STD-XA* profiles
Series Instance	UID (0020,000E)	1	
Series Instance UID	(0020,000E)	1	
Image Keys			**Directory Record Type IMAGE**
Specific Character Set	(0008,0005)	1C	see section 7 on page 137
Image Type	(0008,0008)	3	identification characteristics Type 1 in STD-XA* profiles
SOP Class UID	(0008,0016)	3	
SOP Instance UID	(0008,0018)	3	
Image Date	(0008,0023)	3	
Image Time	(0008,0033)	3	
Referenced Image Sequence	(0008,1140)	3	Type 1C in STD-CTMR profile, required if present in image
> Referenced SOP Class UID	(0008,1150)		
> Referenced SOP Instance UID	(0008,1155)		
Image Number	(0020,0013)	1	
Image Position (Patient)	(00020,0032)	3	Type 1C in STD-CTMR profile, required if present in image
Image Orientation (Patient)	(0020,0037)	3	Type 1C in STD-CTMR profile, required if present in image
Frame Of Reference UID	(0020,0052)	3	Type 1C in STD-CTMR profile, required if present in image
Rows	(0028,0010)	3	
Rows	(0028,0010)	3	
Pixel Spacing	(0028,0030)	3	Type 1C in STD-CTMR profile,

			required if present in image
Calibration Image	(0050,0004)	3	Type 2 in STD-XA* profiles, for XA IOD
Icon Image Sequence	(0088,0200)	3	required for XA Application profiles, optional for the others
> Samples per Pixel	(0028,0002)	1	
> Photometric Interpretation	(0028,0004)		MONOCHROME2
> Rows	(0028,0010)		128 for XA IOD, 64 otherwise Type 1 in STD-CTMR profile
> Columns	(0028,0011)		128 for XA IOD, 64 otherwise Type 1 in STD-CTMR profile
> Bits Allocated	(0028,0100)		8
> Bits Stored	(0028,0101)		8
> High Bit	(0028,0102)		7
> Pixel Representation	(0028,0103)		0 (unsigned)
> Pixel Data	(7FE0,0010)		Icon Image pixel data

see also section 11.2.1 on page 161 for the DICOMDIR attributes set for CsaNonImage IOD.

6.3.1.3.2 STD-GEN-CD

For media conforming to the STD-GEN-CD Profile the following SOP classes will be support-ed as an FSR, FSC,FSU

Table 5: SOP Classes conforming STD-GEN-CD

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	M	M	O
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	O	M	O
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	O	M	O
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	M	M	O
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	O	M	O
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Big Endian Uncompressed	O	M	O

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
		1.2.840.10008.1.2.2			
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	M	M	O
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	O	M	O
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	O	M	O
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O
CR Image	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	M	M	O
CR Image	1.2.840.10008.5.1.4.1.1.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	O	M	O
CR Image	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	O	M	O
CR Image	1.2.840.10008.5.1.4.1.1.1	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O
CT image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	M	M	O
CT Image	1.2.840.10008.5.1.4.1.1.2	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	O	M	O
CT Image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	O	M	O
CT Image	1.2.840.10008.5.1.4.1.1.2	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O
MR Image	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	M	M	O
MR Image	1.2.840.10008.5.1.4.1.1.4	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	O	M	O
MR Image	1.2.840.10008.5.1.4.1.1.4	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	O	M	O
MR Image	1.2.840.10008.5.1.4.1.1.4	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50	O	O	O

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
		1.2.840.10008.1.2.4.51			
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	M	M	O
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	O	M	O
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	O	M	O
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	M	M	O
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	O	M	O
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	O	M	O
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O
NM Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	M	M	O
NM Image	1.2.840.10008.5.1.4.1.1.20	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	O	M	O
NM Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	O	M	O
NM Image	1.2.840.10008.5.1.4.1.1.20	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O

FSC, FSR, FSU – denote the requirements for those roles

O – Optional

M - Mandatory

6.3.1.3.3 STD-CTMR-xxxx

Table 6: SOP Classes STD-CTMR-xxxx

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
CT Image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian	yes	yes	yes

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
		Uncompressed 1.2.840.10008.1.2.1			
CT Image	1.2.840.10008.5.1.4.1.1.2	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
MR Image	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
.MR Image	1.2.840.10008.5.1.4.1.1.4	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
SC Image (grayscale)	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
SC Image (grayscale)	1.2.840.10008.5.1.4.1.1.7	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
SC Image (palette color)	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes

Detached Patient Management is not supported for import and therefore no precedence of values from those Instances can be supported.

6.3.1.3.4 STD-XABC-CD

For media conforming to the STD-XABC-CD Profile the following SOP classes will be supported

as an FSR,FSC,FSU

Table 7: STD-XABC-CD Supported SOP Classes

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
XA Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes

Detached Patient Management is not supported for import and therefore no precedence of values

from those Instances can be supported.

The FSC will create only images with Rows = Columns = 512 on the media.

6.3.1.3.5 STD-XA1K-CD

For media conforming to the STD-XABC-CD Profile the following SOP classes will be supported as an FSR,FSC,FSU

Table 8: STD-XA1K-CD Supported SOP Classes

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
XA Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
SC Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1			

Standalone IODs (Standalone Overlay, Standalone Curve, etc.) are not supported by either FSR/ FSC/FSU. Detached Patient Management is not supported for import and therefore no precedence of val-ues from those Instances can be supported.

6.3.1.3.6 STD-US-zz-yF-xxx(Single and multiframe)

For media conforming to the STD-US-zz-yF-FLOP, STD-US-zz-yF-MOD128, STD-US-zz--

yF-MOD230, STD-US-zz-yF-MOD540, STD-US-zz-yF-MOD650, STD-US-zz-yF-MOD12,

STD-US-zz-yF-MOD23, STD-US-zz-yF-CDR Profiles the following SOP classes and transfer

syntaxes will be supported as an FSR, FSC,FSU

Note:

- • 'yF' in in the application profile name must be replaced by SF for Single Frame and MF for Multi Frame
- • 'zz' in the application profile name must be replaced by any one of ID, SC, CC (Image Dis-play, Spatial Calibration, Combined Calibration)

Table 9: STD-US-ID-yF-xxx Supported SOP Classes

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
Ultrasound Multiframe Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes

Only the following Photometric Interpretations are supported by FSR/FSC/FSU:

- MONOCHROME2
- PALETTE COLOR
-RGB

This restriction also applies for FSR.

6.4 Augmented and Private Profiles

6.4.1 Augmented Application Profiles

When configuring a compressed Transfer Syntax the STD-CTMR and STD-GEN application profile classes will be extended to store instances of the following SOP classes in compressed format:

Table 10: Augmented Application profiles, Activities, and Roles for DICOM Archive

Application Profiles Supported	**Real World Activity**	**Role**	**SC Option**
AUG-GEN-CD AUG-CTMR-MOD650 AUG-CTMR-MOD12 AUG-CTMR-MOD23 AUG-CTMR-CD	Browse Directory Information	FSR	Interchange
	Import into local Storage	FSR	Interchange
	Export to local archive media	FSC,FSU	Interchange

6.4.1.1 AUG-GEN-CD, AUG-CTMR-xxxx

For media conforming to the AUG-GEN-CD or AUG-CTMR-MOD650, AUG-CTMR-MOD12, AUG-CTMR-MOD23, AUG-CTMR-CD Profile the following SOP classes will be supported as an FSR, FSC,FSU

Table 11: AUG-GEN-CD, AUG-CTMR-xxxx Supported SOP Classes

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	M	M	O
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	O	M	O
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	Explicit VR Big Endian Uncompressed	O	M	O

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
		1.2.840.10008.1.2.2			
X-Ray Angiographic Image	1.2.840.10008.5.1.4.1.1.12.1	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	O	O	O
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	M	M	O
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	No	Yes	no
X-Ray Radiofluoroscopic Image	1.2.840.10008.5.1.4.1.1.12.2	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	yes	yes	yes
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	No	Yes	no
Secondary Capture Image	1.2.840.10008.5.1.4.1.1.7	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	yes	yes	yes
CR Image	1.2.840.10008.5.1.4.1.1.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
CR Image	1.2.840.10008.5.1.4.1.1.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
CR Image	1.2.840.10008.5.1.4.1.1.1	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	No	Yes	no
CR Image	1.2.840.10008.5.1.4.1.1.1	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	yes	yes	yes
CT image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
CT Image	1.2.840.10008.5.1.4.1.1.2	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
CT Image	1.2.840.10008.5.1.4.1.1.2	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	no	yes	no
CT Image	1.2.840.10008.5.1.4.1.1.2	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	yes	yes	yes

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
MR Image	1.2.840.10008.5.1.4.1.1.4	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
MR Image	1.2.840.10008.5.1.4.1.1.4	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
MR Image	1.2.840.10008.5.1.4.1.1.4	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	no	yes	no
MR Image	1.2.840.10008.5.1.4.1.1.4	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	yes	yes	yes
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	no	yes	no
Ultrasound Image	1.2.840.10008.5.1.4.1.1.6.1	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	yes	yes	yes
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	no	yes	no
Ultrasound Multi-frame Image	1.2.840.10008.5.1.4.1.1.3.1	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	yes	yes	yes
NM Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes
NM Image	1.2.840.10008.5.1.4.1.1.20	JPEG Lossless Process 14 (selection value 1) 1.2.840.10008.1.2.4.70	yes	yes	yes
NM Image	1.2.840.10008.5.1.4.1.1.20	Explicit VR Big Endian Uncompressed 1.2.840.10008.1.2.2	no	yes	no
NM Image	1.2.840.10008.5.1.4.1.1.20	JPEG Lossy (baseline or extended) 1.2.840.10008.1.2.4.50 1.2.840.10008.1.2.4.51	yes	yes	yes

6.4.2 Private Application Profiles

The following Private Application Profiles supported to store private objects in addition to the Standard SOP classes allowed for the corresponding Standard Application Profile

Table 12: Private Application profiles, Activities, and Roles for DICOM Archive

Application Profiles Supported	**Real World Activity**	**Role**	**SC Option**
PRI-GEN-CD PRI-CTMR-MOD650 PRI-CTMR-MOD12 PRI-CTMR-MOD23 PRI-CTMR-CD	Browse Directory Information	FSR	Interchange
	Import into local Storage	FSR	Interchange
	Export to local archive media	FSC,FSU	Interchange

6.4.2.1 PRI-GEN-CD, PRI-CTMR-xxxx

For media conforming to the PRI-GEN-CD or PRI-CTMR-MOD650, PRI-CTMR-MOD12, PRI-CTMR-MOD23, PRI-CTMR-CD Profile the following SOP classes will be supported as an FSR, FSC,FSU in addition to the Standard SOP classes allowed for the corresponding Stan-dard Application Profiles.

Table 13 PRI-GEN-CD, PRI-CTMR-xxxx Supported SOP Classes

Information Object Definition	SOP Class UID	Transfer Syntax UID	FSC	FSR	FSU
CsaNonImage	1.3.12.2.1107.5.9.1	Explicit VR Little Endian Uncompressed 1.2.840.10008.1.2.1	yes	yes	yes

The DICOMDIR file will contain the Directory record as described in section 10.1.3 on page 145 but with the following Private Keys instead of the Image Keys:

Table 14 DICOMDIR keys for CsaNonImage

Attribute Name	**Tag**	**Private Creator**	**Type**	**Notes**
Directory Record Type -	(0004,1430)		1	PRIVATE
Private Record UID -	(0004,1432)		1	1.3.12.2.1107.5.9.1
Private keys				
SOP Class UID -	(0008,0016)		3	1.3.12.2.1107.5.9.1
SOP Instance UID	(0008,0018)		3	
Image Type -	(0008,0008)		3	identification characteristics
Acquisition Date -	(0008,0022)		3	The date the acquisition of data that resulted in this data set

				started.
Acquisition Time -	(0008,0032)		3	The time the acquisition of data that resulted in this data set started.
Acquisition Number -	(0020,0012)		3	A number identifying the single continu-ous gathering of data over a period of time which resulted in this data set.
CSA Data Type	(0029,xx08)	SIEMENS CSA NON-IMAGE	1.	CSA Data identification characteristics
CSA Data Version	(0029,xx09)	SIEMENS CSA NON-IMAGE	3	Version of CSA Non-Image Data

No IconImageSQ will be stored for CsaNonImage objects.

6.5 Extensions, Specializations and Privatizations of SOP Classes and Transfer Syntaxes

n.a.

7 Configuration

7.1 AE Title / Presentation Address Mapping

To ensure unique identification the hostname should be part of the AE Titles, abbreviated AETs. The string can be up to 16 characters long and must not contain any extended characters, only 7 bit ASCII characters (excluding control characters) are allowed according to the DICOM standard. An example name is HRI_station4.

Local AE Titels and Presentation Addresses

The local AETs can be configured using the Service application. The following AETs can be entered:

- One common AET for Storage AE, Storage Commitment AE and Query/Retrieve AE.
- One AET for Modality Worklist AE.
- One AET for Print AE

Storage and Query/Retrieve SCP listen on port 104

Remote AE Titles and Presentation Addresses

For remote AETs, host names, IP addresses and port numbers can be configured using the Service application. For each AET a list of supported services can also be configured.

1 Configurable Parameters

7.1.1 Storage, Storage Commitment and Query Retrieve

The Service application can be used to set the AETs, port numbers, host names, IP addresses and capabilities for the remote nodes' (SCP's). The user can select transfer syntaxes, compression types and query models for each SCP separately.

Additional configurable parameters for Storage Commitment are:

When acting as SCU:

- flag to indicate wether the association will be kept open to receive the response or to close the association and be prepared to receive the response on another association.
- time-out which defines how long the association of N-ACTION is kept to receive a N-EVENT-REPORT on the same association.
- time-out for N-EVENT-REPORT (applicability of transaction UID) (default 1 h)

- a quality factor which determines the proposed transfer syntax in case that an user has initiated the C-STORE. By convention, 0 means: Only Uncompressed Transfer Syntax(es) are proposed, 100 means: Lossless Transfer Syntax is proposed, and any other value between 1 and 99 means that an JPEG Lossy Transfer Syntax is proposed. One Uncompressed Transfer Syntax will be proposed in any case. This parameter is general for all destination nodes.
- a “compression type supported” which determines the proposed transfer syntax in case that the C-STORE was initiated as a suboperation of an incoming C-MOVE-RQ. By convention, 0 means: Only Uncompressed Transfer Syntax(es) are proposed, 1 means: Lossless Transfer Syntax is proposed, and 2 means that an JPEG Lossy Transfer Syntax is proposed. One uncompressed transfer syntax will be proposed in any case. This parameter can be set for each configured destination node.

When acting as SCP:

- flag to indicate if an archive system is installed

7.1.2 Print

The Service application can be used to configure the SCP. AET, host name, IP address and port number can be set.

7.1.3 Modality Worklist

The Service application can be used to set the AETs, port numbers, host names, IP addresses, capabilities and time-outs for the remote nodes' (SCP's)

Additional configurable parameters for Modality Worklist Query are:

- Query Waiting time - the time to wait for the C-FIND-RSP after sending the C-FIND-RQ (default 20 sec.)
- Max Query Match Number - the maximum number of entries accepted in one worklist (default is 200)
- Query Interval: the time between two C-FIND-RQ to the Hospital Information system (default is 60 min.)
- Broad Worllist Query behaviour: two values are defined:

  Set the AE Title search attribute to the own AE Title, and the Modality search attribute to "*".

  Set the Modality search attribute to the own modality and the AE Title search attribute to "*".

7.2 Default Parameters

- maximal PDU size is set to 28672 Bytes
- time-out for accepting/rejecting an association request: 60 s
- time-out for responding to an association open/close request: 60 s

- time-out for accepting a message over network: 60 s
- time-out for waiting for data between TCP/IP-packets: 60 s

The Time-outs for waiting for a Request/Response message from the remote node are as following:

- for Storage SCP/SCU: 600 s
- for Storage Commitment SCU:

time-out for Response to N-ACTION: 600 s
time-out for N-EVENT-REPORT: configurable, see section 6.2 on page 130

- for Query/Retrieve SCP/SCU: 600 s
- for Modality Worklist SCU: configurable, see section 6.2 on page 130
- for Print Management SCU:
  time-out for Response to N-SET-RQ: 240 s
  time-out for Response to other Requests: 60 s

8 APPENDIX

9 DICOM implementation and configuration hints

- *DICOM Toolkit:* MergeCOM3 version 2.33

- *Syngo Version:* VB10H

- *Location of Merge files (.ini, .pro, .srv):*
  For all DICOM Services the same mergecom configuration files will be used. They are located in the directory \syngo\config\merge.

10 DICOM Test Tools

- *What are the abilities of the DICOM Test Tools?*

The system provides DICOM Service Tools which can be started from the service user interface by means of a special service key.

You are able to perform the following tasks:

- Verification: ping and C_ECHO (Verification) to all or a certain configured destination
- Storage: turn on extended logfile trace (merge.log); capture, dump, verify display and send DICOM images.
- Storage Commitment: turn on extended logfile trace (merge.log)
- Query/Retrieve: turn on extended logfile trace (merge.log)
- Basic Print: simulate camera and display the appropriate sent images; turn on extended logfile trace (merge.log)
- Worklist: turn on extended logfile trace (merge.log)

Known problems from installations can be found in the TD Knowledge Base:

http://www-td.med.siemens.de

DICOM installations and DICOM Test Results can be found in the 'DICOM Interoperability Data Base' located on the CCC Intranet page:

http://dicom.med.siemens.de

Name, Date

10.1 Attributes for the generated XA SOP

Tag	Name	Type	Content

0002,0000	Group Length	UL	
0002,0010	Transfer Syntax UID	UI	1.2.840.10008.1.2.1
0002,0012	Implementation Class UID	UI	1.3.12.2.1107.5.9.20000101
0002,0013	Implementation Version Name	SH	SIEMENS_SWFVB10H
0008,0005	Specific Character Set	CS	ISO_IR 100
0008,0008	Image Type	CS	ORGINAL/PRIMARY/OTHER/ISOC_3D
0008,0016	SOP Class UID	UI	1.2.840.10008.5.1.4.1.1.12.1
0008,0018	SOP Instance UID	UI	1.3.12.2.1107.5.12.6.1.2.0.1108 8717122394
0008,0020	Study Date	DA	20020419
0008,0021	Series Date	DA	20020419
0008,0022	Acquisition Date	DA	20020419
0008,0023	Content Date	DA	20020419
0008,0030	Study Time	TM	164639.640000
0008,0031	Series Time	TM	164639.671000
0008,0032	Acquisition Time	TM	164741.593000
0008,0033	Content Time	TM	164741.609000
0008,0050	Accession Number	SH	Not used
0008,0060	Modality	CS	XA
0008,0070	Manufacturer	LO	SIEMENS
0008,0080	Institution Name	LO	Value as defined
0008,0090	Referring Physician’s Name	PN	Not used
0008,1030	Study Description	LO	
0008,103E	Series Description	LO	2D_IMAGES
0008,1050	Performing Physician’s Name	PN	Not used
0008,1070	Operators’ Name	PN	Not used
0008,1090	Manufacturer’s Model Name	LO	Not used
0010,0010	Patient’s Name	PN	wuerfel
0010,0020	Patient ID	LO	20020419074207
0010,0030	Patient's Birth Date	DA	19690202
0010,0040	Patient's Sex	CS	F
0018,0060	KVP	DS	Not used
0018,1000	Device Serial Number	LO	1
0018,1020	Software Versions	LO	EA02A\EA02A
0018,1030	Protocol Name	LO	ASPIA
0018,1063	Frame Time	DS	1200
0018,1147	Field of View Shape	CS	ROUND
0018,1150	Exposure Time	IS	Not used
0018,1151	X-ray Tube Current	IS	Not used
0018,1155	Radiation Setting	CS	SC
0018,115A	Radiation Mode	CS	CONTINUOUS
0018,115E	Image Area Dose Product	DS	0.05
0018,1166	Grid	CS	IN
0018,1244	Preferred Playback Sequencing	US	Not used
0018,1500	Positioner Motion	CS	STATIC
0018,1510	Positioner Primary Angle	DS	Not used
0018,1511	Positioner Secondary Angle	DS	Not used
0018,1600	Shutter Shape	CS	CIRCULAR
0018,1610	Center of Circular Shutter	IS	2 0\0
0018,1612	Radius of Circular	IS	Not used

	Shutter		
0018,5100	Patient Position	CS	Not used
0020,000D	Study Instance UID	UI	1.3.12.2.1107.5.12.6.1.2.0.1055 0622063153
0020,000E	Series Instance UID	UI	1.3.12.2.1107.5.12.6.1.2.0.1055 1436542245
0020,0010	Study ID	SH	
0020,0011	Series Number	IS	2
0020,0013	Instance Number	IS	
0020,0020	Patient Orientation	CS	
0020,1000	Series in Study	IS	
0020,4000	Image Comments	LT	
0028,0002	Samples per Pixel	US	
0028,0004	Photometric Interpretation	CS	MONOCHROME2
0028,0008	Number of Frames	IS	50
0028,0009	Frame Increment Pointer	AT	(0018,1063)
0028,0010	Rows	US	512
0028,0011	Columns	US	512
0028,0100	Bits Allocated	US	8
0028,0101	Bits Stored	US	8
0028,0102	High Bit	US	7
0028,0103	Pixel Representation	US	0
0028,1040	Pixel Intensity Relationship	CS	LIN
0028,1050	Window Center	DS	106
0028,1051	Window Width	DS	185
0029,0010	Private Creator	LO	SIEMENS CSA HEADER
0029,0011	Private Creator	LO	SIEMENS MEDCOM HEADER
0029,1008		CS	ASPIA
0029,1009		LO	ASPIA
0029,1010		OB	80 84 1E 00 42….
0029,1131		LO	2.0.110890
0029,1134		CS	DB TO DICOM
7FE0,0010	Pixel Data	OW	

10.2 Attributes for the generated CT SOP

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"\\erlh600a\FREI\Mike\aaaa.ima"

0002,0000	Group Length	UL	86
0002,0010	Transfer Syntax UID	UI	1.2.840.10008.1.2.1
0002,0012	Implementation Class UID	UI	1.3.12.2.1107.5.9.20000101
0002,0013	Implementation Version Name	SH	SIEMENS_SWFVB10H
0008,0005	Specific Character Set	CS	ISO_IR 100
0008,0008	Image Type	CS	ORIGINAL\PRIMARY\AXIAL\ISOC_3D
0008,0016	SOP Class UID	UI	1.2.840.10008.5.1.4.1.1.2

0008,0018	SOP Instance UID	UI	1.3.12.2.1107.5.12.6.1.2.0.108 21674872829
0008,0020	Study Date	DA	20020419
0008,0021	Series Date	DA	20020419
0008,0022	Acquisition Date	DA	20020419
0008,0023	Content Date	DA	20020419
0008,0030	Study Time	TM	164639.640000
0008,0031	Series Time	TM	164639.656000
0008,0032	Acquisition Time	TM	164652.187000
0008,0033	Content Time	TM	164652.203000
0008,0050	Accession Number	SH	Not used
0008,0060	Modality	CS	CT
0008,0070	Manufacturer	LO	SIEMENS
0008,0080	Institution Name	LO	Hospital
0008,0090	Referring Physician’s Name	PN	Not used
0008,1030	Study Description	LO	Not used
0008,103E	Series Description	LO	3D_IMAGES
0008,1050	Performing Physician’s Name	PN	Not used
0008,1070	Operators’ Name	PN	Not used
0008,1090	Manufacturer’s Model Name	LO	Configuration
0010,0010	Patient’s Name	PN	Wuerfel
0010,0020	Patient ID	LO	20020419074207
0010,0030	Patient's Birth Date	DA	19640202
0010,0040	Patient's Sex	CS	F
0018,0050	Slice Thickness	DS	0.5021618
0018,0060	KVP	DS	Not used
0018,1000	Device Serial Number	LO	Not used
0018,1020	Software Versions	LO	EA02A\EA02A
0018,1030	Protocol Name	LO	ASPIA
0020,000D	Study Instance UID	UI	1.3.12.2.1107.5.12.6.1.2.0.105 50622063153
0020,000E	Series Instance UID	UI	1.3.12.2.1107.5.12.6.1.2.0.105 50816681650
0020,0010	Study ID	SH	1
0020,0011	Series Number	IS	1
0020,0012	Acquisition Number	IS	Not used
0020,0013	Instance Number	IS	100
0020,0032	Image Position Patient	DS	-64.02563\64.02563\14.311611
0020,0037	Image Orientation Patient	DS	-1\0\0\0\1\0
0020,0052	Frame of Reference UID	UI	1.3.12.2.1107.5.12.6.1.2.0.106 54163342650
0020,1000	Series in Study	IS	2
0020,1040	Position Reference Indicator	LO	Not used
0020,4000	Image Comments	LT	Not used
0028,0002	Samples per	US	1

	Pixel		
0028,0004	Photometric Interpretation	CS	MONOCHROME2
0028,0008	Number of Frames	IS	1
0028,0009	Frame Increment Pointer	AT	0018,1063)
0028,0010	Rows	US	256
0028,0011	Columns	US	256
0028,0030	Pixel Spacing	DS	0.5021618\0.5021618
0028,0100	Bits Allocated	US	16
0028,0101	Bits Stored	US	12
0028,0102	High Bit	US	11
0028,0103	Pixel Representation	US	0
0028,1050	Window Center	DS	875\1023
0028,1051	Window Width	DS	976\2048
0028,1052	Rescale Intercept	DS	1
0028,1053	Rescale Slope	DS	1
0029,0010	Private Creator	LO	SIEMENS MEDCOM HEADER
0029,0011	Private Creator	LO	ISOC 3D NAVIGATIONMATRIX.R. 1.0
0029,1031	private	LO	2.0.108219
0029,1034	private	CS	DB TO DICOM
0029,1100	private	LO	\\YBLB013704\IMAGES\2.0.18477\ 20020419-16_46_17_500\M_A.tm
0029,1101	private	LO	000347685149
0029,1102	private	LO	SID4711
0029,1103	private	LO	CID0518
0029,1104	private	DS	0.99946359\-0.032174873\-0.00610785\-46.265209\0.032266034\0.999... (146 Bytes)
0029,1105	private	LO	TM_ET_4066800000000000_050_Entwicklungsrechner.tm
0029,1106	private	US	50
0029,1107	private	US	50
7FE0,0010	Pixel Data	OW	031E 0327 0347 034D 0308 031E 0322 0322 0332 02FC 0332 0322 ...(131072 Bytes)

Index

Implementation Class UID Uroskop Access 27
wildcard queries 58